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ESTIMATION OF NICOTINE.

By Emil Scheffer.

Several methods have been published to estimate the amount of nicotine in tobacco, but for its estimation in different preparations of tobacco we have only the volumetric test with Mayer's solution, which, although not quite perfect, yet gives approximately correct results.

The writer had lately to make a large number of estimations of nicotine from tobacco extracts, which he executed according to Dragendorff's method.[1]

One of the greatest obstacles for correct work is the circumstance that a more dilute solution of nicotine requires a larger proportion of Mayer's solution than a stronger solution. To get if possibly a clue to this anomaly, I decided to prepare pure nicotine, and make experiments with it.

Pure nicotine was prepared by distilling extract of tobacco with caustic soda; the distillate was slightly supersaturated with sulphuric acid then evaporated and treated with absolute alcohol to separate the sulphate of ammonium. The alcoholic solution of sulphate of nicotine was evaporated on a water-bath to drive off the alcohol; the watery solution of residue was mixed with ether, and concentrated solution of caustic soda added. After repeated strong agitation the mixture was allowed to separate; the ethereal solution was drawn off with a pipette into a tared beaker, and the ether allowed to evaporate spontaneously. When the odor of ether had disappeared, the remaining liquid, which had a slight yellowish tint, was weighed, dissolved in water, and the amount of nicotine in it ascertained with normal volumetric solutions of hydrochloric and sulphuric acids.

The neutralized solutions were then, with the addition of distilled water, brought to a certain volume.

[1] Die chemische Werthbestimmung einiger stark wirkenden Droguen. Von Dr. G. Dragendorff. St. Petersburg, 1874.

A. 4·387 residue of ethereal extraction required 24·3 cc. of normal HCl, corresponding to 3·936 pure nicotine.

The neutralized solution was diluted to 500 cc. of 0·787 per cent. nicotine.

B. 8·793 residue of ethereal extraction were dissolved in water to measure 250 cc.; of these 20 cc. required for neutralization 3·56 normal oxalic acid.

a. 80 cc. required 14·4 cc. of normal HCl; were diluted to 250 cc.

b. 80 cc. required 14·4 cc. of normal H_2SO_4; were diluted to 250 cc.

c. 60 cc. required 10·8 cc. of normal H_2SO_4; were also brought to 250 cc.

According to the quantity of H_2SO_4 needed for the neutralization of 80 cc. of solution B, the 8·793 of ethereal residue correspond to 7·290 nicotine, and B. a. contains 2·333 nicotine, or 0·9332 per cent.; [1]B. b. contains 2·333 nicotine, or 0·9332 per cent.; B. c. contains 1·749 nicotine, or 0·6996 per cent.

The tests were made with Mayer's solution, which was prepared from perfectly pure mercuric chloride and potassium iodide, so that 1 cc. contained exactly 0·01354 $HgCl_2$ and 0·0498 KI.

Taking the equivalent for nicotine as 162, and supposing that the precipitate obtained was composed of $HgI_2,C_{10}H_{14}N_2(HI)_2$, and has therefore the molecular weight of 872, it was found that Dragendorff gives the amount of nicotine that is indicated by 1 cc. of M. S. too low, and that it ought to be twice as large, that is, instead of 0·00405, it ought to be 0·0081.

The writer was first led to these investigations by the statement of Dragendorff, that only one-half of M. S. used, was used for the formation of the precipitate. Mr. Zinnoffsky, who made the tests, has ascertained the amount of mercury in the precipitate, judging by this of the composition of the precipitate; but he has not weighed (at least nothing is said about) the precipitate, and then he has omitted to prove the presence of nicotine in the liquid after M. S. has ceased to give precipitate.

Then, also, by taking the composition of hydrochloride of nicotine as $C_{10}H_{14}N_2(HCl)_2$, another reason is given for obtaining the coefficient of nicotine too small.

[1]10 cc. were allowed to evaporate spontaneously under a desicator; the residue weighed 0·123.

0·09332 nicotine correspond to 0·1215 sulphate of nicotine.

Why it is that all our text-books give the composition of hydrochloride of nicotine as $C_{10}H_{14}N_2(HCl)_2$, while the sulphate, they say, consists of 1 equivalent of nicotine and 1 equivalent of sulphuric acid, is difficult to understand, as the same quantity of nicotine which is neutralized by 49 H_2SO_4 is also neutralized by 36·4 HCl.

Gmelin has the composition of sulphate of nicotine, $C_{20}H_{14}N_2,HO,SO_3$ (old notation), and Husemann says that 49 sulphuric acid neutralizes 162 nicotine, and both authors give for the hydrochloride:

$C_{10}H_{14}N_2(HCl)_2$, Husemann, and
$C_{20}H_{14}N_2,2HCl$, Gmelin.

Now for the proof of my assertions.

The precipitate obtained was collected on a tared filter, washed and dried under a bell glass above sulphuric acid, and the amount of Hg and I in it ascertained. For this purpose a certain quantity of the dried precipitate was placed in a beaker and ammonia water added to it, by which the yellowish precipitate was transformed into a fine white powder. When the transformation was completed, freshly prepared ammonium sulphide was added, whereby the mercury was separated as HgS.

After the white precipitate had disappeared, and was entirely decomposed, the precipitate of HgS was collected on a tared filter, washed, dried and weighed. The liquid resulting from the precipitate by Am_2S with the wash water was heated on the water-bath until all odor of H_2S had disappeared, then slightly acidulated with sulphuric acid, and $AgNO_3$ added as long as a precipitate was formed.

After the precipitate had subsided, the liquid was decanted from the precipitate, and filtered through a tared filter; to the moist precipitate of AgI in the beaker, ammonia water was added, and macerated over night, and the next morning the AgI collected on the same filter, thoroughly washed, and, having become air dry, was heated in a drying oven at 212°F. until the weight kept constant.

The ammoniacal liquid running off from the AgI did not become turbid on addition of HNO_3, and thereby the absence of chlorine in the original precipitate was confirmed.

To control the result of examination of the precipitate by M. S., the liquid obtained was also examined; the mercury was precipitated by H_2S, and the precipitate of HgS washed and dried. The liquid,

plus washings, was heated on the water-bath until H_2S was driven off, then pure Na_2CO_3 added, evaporated to dryness, and strongly heated. Dissolved in water, it was slightly acidulated with H_2SO_4, and the amount of I ascertained volumetrically with $\frac{1}{10}$ normal solution of $HgCl_2$. The addition of Na_2CO_3 to the acid solution is necessary to drive off the nicotine in the solution.

In trying to estimate the I in this solution with $HgCl_2$ before use of carbonate of sodium was made, at first a resinous yellow precipitate was obtained similar to the resinous precipitate in the original tests. Other experiments convinced me that nicotine was present, particularly the strong odor after addition of carbonate of sodium and the alkalinity of the vapors.

On making the tests with M. S. it is of importance to avoid and prevent the precipitate from becoming resinous; the precipitate is not uniform in its composition unless certain precautions are observed; when a resinous precipitate is formed, a larger quantity of M. S. is necessary to finish the test.

As the object is to obtain a precipitate of definite composition—$HgI_2,C_{10}H_{14}N_2(HI)_2$—the formation of any resinous precipitate must be avoided. To prevent this, at the beginning a large quantity of M. S. is added at once, and the resulting mixture is briskly stirred until a crystalline precipitate begins forming.

The quantity of acid added to the nicotine solution seems also to have influence; if it is small a resinous precipitate is more apt to be formed. One drop of strong hydrochloric acid for each 10 cc. of nicotine solution acts very well; more acid (2 or 3 drops for 10 cc.) did not seem to influence the quantity of M. S. required.

According to Dragendorff—

19·3 cc. of M. S. in A. would indicate 0·07816 nicotine,
22·5 cc. " in B. a. & b. " 0·091125 "
17·4 cc. " in B. c. " 0·07047 "
and the precipitate in A. should amount to 0·4207
" in B. a. & b. " 0·490
" in B. c. " 0·380

while there was obtained, respectively, 0·724, 0·866 and 0·645, or on an average 73 per cent more than Dragendorff accounts for.

	Volume of Nicotine Solution.	Amount of Nicotine.	Quantity of M.S. required.	Weight of Precipitate.	Liquid off Precipitate. Amount of Hg as HgS.	Liquid off Precipitate. Amount of I.
Hydrochloride of Nicotine.	A.					
	1. 40 cc	·3148	38·7 cc.	1·461	0·052	
	2. 40 cc	·3148	38·3 cc,	1·442	0·055	
	3. 20 cc	·1574	19·3 cc.	0·718	0·027	
	4. 20 cc	·1574	19·5 cc.			
	5. 20 cc	·1574	19·2 cc.			
	6. 20 cc	·1574	19·25 cc.	0·727	0·028	
	7. 20 cc	·1574	19·3 cc.	0·723	0·027	0·315
	8. 20 cc	·1574	19·25 cc.	0·718	0·027	
	Average for 20 cc. of Nicotine Solut.		19·3 cc.	0·724		
	B. a.					
	20 cc	·1866	22·6 cc.	0·862		
	20 cc	·1866	22·4 cc.			
Sulphate of Nicotine.	B. b.					
	1. 20 cc	·1866	22·6 cc.	0·870	0·026	
	2. 20 cc	·1866	22·7 cc.	0·871	0·028	0·352
	3. 20 cc	·1866	22·4 cc.	0·862		
	Average for 20 cc		22·5 cc.	0·866		
	B. c.					
	20 cc	·1398	17·4 cc.	0·645		

Composition of Precipitate.

1·000 of A. 2. yielded 0·270 HgS and 1·085 AgI = 0·586 I.
0·718 of A. 3. " 0·197 HgS and 0·773 AgI = 0·418 I.
0·723 of A. 7. " 0·197 HgS and 0·785 AgI = 0·424 I.

0·197 HgS correspond to 0·385 HgI_2 with 0·215 I.

0·385 HgI_2 deducted from the precipitate, that is from 0·723, leaves 0·338 for acid hydriodide nicotine.

0·215 I deducted from the entire amount of I found in precipitate, from 0·424, leaves 0·209 I, which is as HI in combination with nicotine.

0·723 precipitate give by calculation 0·376 HgI_2 and 0·347 $C_{10}H_{14}N_2(HI)_2$ with 0·210 I.

0·755 of precipitate B. b. 2. yielded 0·205 HgS and 0·820 AgI, or

for 0·871 (the entire precipitate) 0·236 HgS and 0·945 AgI with 0·510 I.

0·236 HgS correspond to 0·461 HgI_2 with 0·258 I.

0·461 HgI_2 deducted from the amount of precipitate, from 0·871, leave 0·410 for acid hydriodide nicotine.

0·258 I deducted from the entire amount of I found in precipitate, from 0·510 leave 0·252 I, which is as HI in combination with nicotine.

Calculation requires for 0·871 precipitate 0·4534 HgI_2 and 0·4176 and hydriodide of nicotine with 0·2537 I.

From these investigations it appears that the composition of the precipitate is $HgI_2,C_{10}H_{14}N_2(HI)_2$.

The presence of nicotine in the liquid, filtered off the precipitate after M. S. has ceased to give a precipitate is evidence that a part of the combination formed is kept in solution, which is easily ascribed to the excess of potassium iodide in Mayer's solution. Dry precipitate, which is very little souble in pure or acidulated water, dissolves to a greater extent when iodide potassium is added to the water.

But as with a certain quantity of M. S. a precipitate ceases to be produced by addition of more, we have a right to assume that the nicotine found in solution is in the same combination as in the precipitate, and from the quantity of mercury in solution the quantity of nicotine can be ascertained.

By calculating the combination in solution from the amount of HgS found, and adding the amount to the precipitate, we obtain nearly double the amount that Dragendorff claims to obtain.

The quantity of nicotine indicated by 1 cc. of Mayer's solution has to be taken therefore as 0·0081, or one-half equivalent.

From among the many perplexing and embarrassing results which were obtained, it is my purpose to mention only a few to prove the assertion that when a resinous precipitate is formed, more M. S. is required to finish the reaction.

20 cc. of A. required 22 cc. of M. S. when the precipitate was resinous at first.

20 cc. of B. c. required 25·7 cc. M. S., the precipitate having formed resinous except towards the last.

20 cc. of B. c. furnished a resinous precipitate until 23 cc. of M. S. were added; the liquid was then decanted and more M. S. added until it ceased to give precipitate; it required 3 cc. more.

0·690 of the concrete resin gave 0·200 HgS, corresponding to 0·391 HgI_2, an amount much larger than in the successful experiments.

To 20 cc. of B. c. were at first added 12 cc. of M. S.; the crystalline deep yellow precipitate was collected on a tared filter, washed and dried; to the liquid more M. S. was added until it ceased to give precipitate; 10·4 cc. were required. The second precipitate was also collected on a tared filter, washed and dried, and from the liquid the Hg was precipitated by H_2S, yielding 0·033 HgS.

First precipitate weighed 0·482
Second " " 0·353

In regard to the circumstance that a more dilute solution of nicotine requires more M. S. than one of a certain concentration, it is my impression that it is owing principally to the formation of resinous precipitate, which is more apt to be formed in very dilute solutions. The resinous precipitate has a different composition from the regular crystalline precipitate, and contains proportionally a larger amount of HgI_2. Experiments made with dilute solutions of A. and B. showed that the more resinous precipitate is formed the more M. S. was required.

A solution for testing ought to contain at least 0·5 per cent. of nicotine to obtain correct results.

LOUISVILLE, KY., September, 1884.

MENTHOL.—I think it was Mr. Malcolm Morris who, some time ago, spoke of the antiseptic use of menthol in ringworm of the scalp. I applied a solution in rectified spirit to the tinea tonsurans of a young friend in the winter of 1879, and cure resulted; and recently I have met with success in this disease from a pomade of menthol, iodoform and vaseline.

In facial neuralgia, in some forms of sciatica, in neuralgic headache (clavus) and in toothache, the most recent instance being in a severe case of a lady recovering from acute alcoholism, I have repeatedly found relief to follow within a few minutes of its application. The cones or sticks are useful for external application. Frequently, however, I use now the following formula: Menthol, 30 grains; and spirit of rosemary, rectified spirit, each two drachms; or compound spirit of lavender may be used instead of the rosemary for application to the cavity of a carious tooth. I have only taken it once internally myself, but never have prescribed it. This has, however, been done.—*Brit. Med. Jour.; Louisv. Med. News.*

INFUSION OF DIGITALIS.

By Frank Elliott Valentine, Ph.G.

From an Inaugural Essay.

Prepared with tincture of cinnamon according to the formula of the U. S. P., 1870, a very unsatisfactory preparation was the result; the objection arising from the persistent precipitate, which made its appearance within a few hours, continued to form after filtration, and was not completed in the specimen under examination after a period of six weeks. Whether or not this precipitate contained any digitalin or any active principle of the drug has been the subject of some discussion (see paper by D. E. Prall, in "Am. Jour. Phar.," 1878, p. 422). By way of experiment the whole amount of precipitate from four pints of infusion was collected, dried and administered to an adult within a period of ten hours. The amount taken was not less than fifty grains, and was in a rather impure state, yet this quantity produced no other effect than a slight nausea; no reduction of the pulse nor any action whatever upon the heart being noticed.

A few drops of hydrochloric acid were added to two pints of another portion of the infusion; a copious precipitate was thrown down within two hours. This was collected and dried, and the entire quantity, about thirty grains, administered to an adult within a period of ten hours. No effect was noticed, the nausea of the former experiment being absent.

The conclusion arrived at as a result of these experiments coincides with that of others, viz., that the precipitate is due to the presence of cinnamon and is inert. In the opinion of the writer it consists of an altered form of tannic acid, thrown out from the cinnamon, and contains no digitalin nor any active principle of the digitalis. But the fact that the precipitate is inert, is no reason why its presence should be disregarded.

An improvement in the formula was attempted in the last revision of the Pharmacopœia by the substitution for tincture of cinnamon of the old formula, of sufficient amount of the bark to produce the proper aromatic effect. This change served only to lessen the amount of the precipitate, but failed to overcome the difficulty. It has been suggested by some to omit the cinnamon altogether or to replace it by the addition of a small quantity of oil of cinnamon. Yet, in the opinion

of the writer, a formula differing as slightly from the one already in use as is possible is to be preferred, and it is the object of this essay to furnish one which will produce a preparation free from precipitate and yet differ so slightly in taste and odor from the officinal one as to suit the most fastidious. This is accomplished by the addition of one ounce (15 parts) of glycerin to each pint (200 parts) of the infusion. According to this formula a preparation was made which showed no indication of any precipitation after a period of three weeks. The change of taste produced by the presence of the glycerin is slight and of such a nature as to render the preparation more agreeable than heretofore, and no exceptions to the use of it could justly be taken on these grounds, nor could any objectionable therapeutic effect possibly arise from its presence.

In the course of experiment an infusion was made to which a small quantity of solution of potash was added with a view of preventing precipitation. As far as this object was concerned it was quite successful, but objections to its use arise from the fact that a deep red color and a decided saponaceous taste are imparted to the liquid, effects which are objectionable.

THE PRECIPITATE FROM THE TINCTURE OF SANGUINARIA.

By William John McConn, Ph.G.

From an Inaugural Essay.

Having observed that in quite a short time, precipitation takes place in the Tincture of Sanguinaria, and unable to find from the various works I have consulted that the nature of this precipitate has been determined;[1] I have undertaken its investigation, with a view of suggesting some means of preventing it. It is deposited on the sides and bottom of the shop tincture bottle, and is not perceptibly removed by the most violent agitation. It is of granular appearance and brownish-black color; when collected and dried it is in the form of a smooth powder of a reddish-brown color leaving a yellowish-brown stain on the skin, without perceptible odor and of slightly acrid taste; when seen under the microscope, it has the appearance of being massed with a rough somewhat granular surface.

[1] Mr. F. L. Slocum determined the presence of sanguinarine in this precipitate; see *Am. Jour Phar.*, 1881, p. 277.

Chloroform being added to the precipitate quickly became of a dull red color which was deepened by the addition of acetic acid, this mixture on standing separated into two layers, both transparent, the upper of a pale straw, and the lower of a deep red color. Upon evaporating the upper layer, a resin-like mass remained, which was translucent, of a dark amber color, soluble in alcohol, also in water; was reddened on the addition of nitric acid, and on charring a black ash resulted. On evaporating the lower layer, a reddish-brown resin-like mass was obtained which was insoluble in ether, alcohol and water, both hot and cold, but readily soluble in chloroform; reddened by nitric acid, and on charring yielded a black ash.

The undissolved portion was treated with alcohol without perceptible change; the addition of ammonium hydrate immediately produced a deep red colored solution, still leaving a large per centage undissolved. This solution yielded upon evaporation a clear, deep red, liquid of syrupy consistence.

The insoluble portion upon incineration yielded a gray ash.

Another portion of the precipitate was then subjected to the action of ammonium hydrate, without any perceptible change, but upon the addition of alcohol a deep red colored solution was obtained, which upon filtering left a yellowish-brown residuum of a sparkling appearance.

The undissolved portion of this precipitate was treated with the above filtrate with the addition of citric acid and again filtered leaving a blackish precipitate on the filter; the filtrate on standing separated into two layers, and of a deep red color, the lower of a pale straw color. The former gave a copious precipitate upon the addition of auric chloride, but no change with platinic chloride; upon evaporation a reddish brown mass was obtained which assumed a decided yellow color, slowly changing to red upon the addition of nitric acid; this residue is perfectly soluble in water.

The straw-colored layer of the above solution was not imflammable and yielded a very small brown product on evaporation, which was changed to a reddish color on the addition of nitric acid, and was soluble in water.

The presence of alkaloid in the precipitate was established by the action of nitric acid and auric chloride, this precipitation is prevented by the presence of a citrate of an alkali and having made a number of tinctures with this end in view I would suggest the use of the citrate of potassium as having given the best results.

ALOIN.

By Henry Charles Plenge, Ph.G.

From an Inaugural Essay.

The only published process which *à priori* seemed practicable for all varieties of aloes is that of Tilden, which was followed. 25 grams of aloes were dissolved in 250 cc. of boiling water acidulated with hydrochloric acid and allowed to cool. The liquid was then decanted from the precipitated resinous matter, evaporated to about 50 cc., and set aside two weeks for crystals to form. The liquid portion was poured off, the crystals were pressed between folds of bibulous paper to remove as much as possible of the adhering resin, and then purification by various means was tried.

The mixture of crystals and resin was dissolved in diluted alcohol, the solution filtered and set aside to crystallize. The crystals were still contaminated with a considerable amount of resinous matter. Other solvents were used, of which acetic ether proved to be the best. The resin is apparently more soluble in ether than the aloin, and when the impure aloin was treated with this solvent and allowed to stand, with occasional agitation, the liquid acquired a brown color, and the yellowish color of the crystals could be distinguished. The liquid was then quickly and carefully poured off and the crystals dried.

Five commercial varieties of aloes were experimented with: Socotrine, Barbadoes, Cape, Curaçao and Bonare. The two latter were very similar in appearance and yielded about the same amount of aloin. From Cape aloes no aloin was obtained.

In the first experiment Socotrine yielded 3 per cent. of aloin; in subsequent trials none was obtained. Barbadoes aloes, to which this process is specially adapted, averaged 9 per cent.; Curaçao averaged 7·5 per cent., and Bonare 7 per cent. The cause of variation in the yield of aloin from different portions of the same sample treated by the same process is evidently due to variation in the degree of heat used in evaporating the infusion and probably also to the length of time at which the heat was applied. By the use of a vacuum apparatus the yield would undoubtedly have been greater and the aloin of a better quality. The aloin finally obtained was not in distinct crystals but in small crystalline crusts.

Aloin was obtained from Socotrine aloes by the following process: One part of Socotrine aloes was digested in 3 parts of alcohol for 24

hours, then transferred to a water-bath and boiled for about two hours. After cooling, the liquid was poured off from the resin, filtered, placed in an open dish, loosely covered and set aside to crystallize. The crystals were then washed with a little alcohol and dried. The yield was about 10 per cent.

ANALYSIS BY CAPILLARITY.

By Hans M. Wilder.

Prof. J. U. Lloyd's article in the September number reminds me of an article by Goppelsrœder, in the "American Journal of Pharmacy" for 1863 (vol. xxxv, p. 178), wherein he shows that a mixture of several colors may very well be analyzed (so to speak) by means of blotting paper; the different colors spreading out unequally—sufficiently so as to separate distinctly. In the same article he refers to an earlier paper by Schœnbein, "on the different heights to which bodies in solution rise by immersing one end of a strip of blotting paper."

Leroy, "American Journal of Pharmacy" for 1861 (vol. xxxiii, p. 93), proposes the same means for examining various compound tinctures, comparing them to a standard.

Prof. Lloyd mentions the height to which chloride of sodium in solution rises (some six feet). In this connection it will be interesting to read a paper by Frankenheim ("Poggendorff's Annalen," lxx, p. 515; condensed in Watt's Dictionary, p. 741), on the height to which different liquids rise.

Musculus (Watt's Dictionary, 1st Suppl., p. 393, and *in extenso* in "Phar. Jour. and Transactions" [2], ix, p. 171) recommends capillarity as a delicate analytical method for the detection of several substances, especially of alcohol and acetic acid in aqueous solutions.

The capillary power of saline solutions is discussed by Buliginski ("Poggendorff's Annalen," cxxxiv, p. 440; condensed in Watt's Dictionary, 2d Suppl., p. 244).

Philadelphia, September 11th, 1884.

Note by the Editor.—The results of Schœnbein's experiments, referred to above, are thus briefly summarized in "Jahresbericht der Chemie," 1861, p. 63: "Experiments with strips of filtering paper, dipping with the lower end into dilute solutions of alkalies, alkaline

earths, acids, salts and coloring matters, until by the absorbed liquids they had been wetted to the height of about an inch, showed, on testing the moistened portion with suitable reagents, that the upper part of the paper moistened by capillarity contained only water, while the dissolved substance was present only in the lower part of the paper, rising to different heights on using solutions of different substances; or that, in general, the water precedes, more or less rapidly, by capillarity, the substances dissolved therein."

From a more extended abstract of Schœnbein's paper, published in "Journal de Pharmacie et de Chimie," 1862 [3], xlii, pp. 28–30, we condense the following particulars: The experiments were made with strips of unsized paper tinged with turmeric or litmus, or impregnated with solution of iron or other salt, or the experiment was performed in an atmosphere of sulphuretted hydrogen or ozone. The paper was suspended at a right angle above the liquid, in such a manner that the lower end dipped two or three millimeters into the solution, and was retained in this position until by capillary attraction the liquid had risen to the height of 3 centimeters. The figures given below indicate the height to which the substances dissolved rose in the paper, the remaining space up to 3 Cm. containing *pure* water.

Potassa, 1 per cent., 2 Cm.
Soda, Lithia, } nearly as above.
Baryta, saturated, 1 Cm.
Strontia, " Lime, " } 3–4 Mm.
Sulphuric acid, 1 per cent., 18 Mm.
Nitric acid, Hydrochloric acid, Oxalic acid, Tartaric acid, } Similar to sulphuric acid.

Phosphoric acid, 1 per cent., 3 Cm. (no separation of water).
Gallic acid, 1 per cent., Pyrogallic acid, } 9 Mm.
Ferric salts, 1 per cent., 15 Mm.
Lead nitrate, 1 per cent., 18 Mm.
Silver salts, Copper salts, Cadmium salts, } Similar to lead.
Potassium iodide, alkaline, 15 Mm. (colored by ozone).

Solution of indigo; 12 Mm. contain the coloring matter; the remaining 18 Mm. contain liquid which is not of uniform composition.

Buliginsky's experiments ("Jahresb. d. Chem.," 1868, pp. 22–26) were made with capillary tubes, and showed that the height to which liquids are drawn is influenced by the temperature and by the strength of the solution. Solutions of ammonium chloride were the only ones of those examined which rose to a greater height than water, while the rise was less for solutions of sugar, potassium nitrate, sodium chlo-

ride, ammonium iodide, potassium chloride, magnesium chloride and ammonia.

Musculus recommended "capillarimetry" more particularly for the detection of alcohol, acetic acid, etc., in aqueous liquids ("Jahresb. d. Chem.," 1864, p. 5), and similar recommendations were previously made by Valson ("Jahresb. Physik," 1857, p. 2).

Experiments on the coefficients of capillarity of numerous substances were made by Wilhelmy ("Pogg. Ann.," cxix, p. 177; "Jahresb. d. Chem.," 1864, p. 6). Chevreul ("Comp. rend.," lxiii, p. 399; "Jahresb. d. Chem.," 1866, p. 8) called "capillary elective affinity" the property of linseed oil of displacing water from white lead, and of water displacing oil from a mixture with kaolin or with gray clay.

BERBERINE AND DERIVATIVES.

The formula of this body, according to Fleitmann, is $C_{42}H_{36}N_2O_9$, according to Kemp, $C_{42}H_{34}N_2O_7$, according to Stas, $C_{44}H_{38}N_2O_{10}$, according to Henry, $C_{42}H_{38}N_2O_{10}$, and according to Serrius and Hlasiwetz, $C_{20}H_{17}NO_4,4\frac{1}{2}H_2O$. From numerous analyses of the free base, the hydrochloride, nitrate, and sulphate, E. Schmidt (*Berichte* 16, 2589), assigns to it the formula $C_{20}H_{17}NO_4 4H_2O$. Analyses of Hlasiwetz and Gilm's hydroberberine (*Annalen*, Suppl., 2, 191), its hydrochloride and nitrate confirm their formula, $C_{20}H_{21}NO_4$. From its behavior with ethyl iodide, hydroberberine must be a tertiary base. Berberine is converted into berberine hydriodide by treatment with ethyl iodide. The hydroxide obtained from hydroberberine ethiodide forms colorless needles melting at 165°; it yields crystalline salts with hydrochloric, nitric, and sulphuric acids, and with platinic chloride. On oxidizing berberine with alkaline permanganate, a bibasic acid, $C_{10}H_{10}O_6+2H_2O$, melting at 165°, is obtained apparently identical with hemipinic acid.

Derivatives.—When berberine is heated in a retort with five times its weight of potassium hydroxide, it blackens, intumesces, and gives off ammonia, together with a small quantity of an oily liquid which, on examination, was found to be quinoline. From the residue in the retort, two acids were isolated, which were found to have all the properties ascribed to them by Hlasiwetz and Gilm; O. Bernheimer

(*Gazzetta*, 13, 342–347), is at present engaged in studying their constitution.

When hydroberberine is heated with methyl iodide at 100° in a closed tube, a yellow crystalline mass is obtained, which may be purified by repeating crystallization from boiling methyl alcohol. It crystallizes in the trimetric system: $a : b : c = 1{\cdot}10332 : 1 : 1.78880$. Observed forms, 001, 111, 113; combinations, 001, 111, 113; cleavage perfect, 001. The *hydroberberine methiodide*, $C_{20}H_{21}NO_4,MeI$, is sparingly soluble in water or alcohol in the cold, but readily when heated. When the iodide suspended in water is treated with silver oxide, it yields the corresponding hydroxide, which may be obtained in crystalline crusts, $C_{20}H_{21}NO_4,MeHO + H_2O$, on evaporating the solution. It is strongly basic, and liberates ammonia from ammonium chloride. It dissolves in cold alcohol, but is insoluble in ether. On adding hydrochloric acid to its aqueous solution, the chloride is precipitated as a crystalline powder. The platinochloride crystallizes in beautiful lustrous plates, soluble in boiling alcohol. When heated in a sealed tube at 150°, the hydroxide is decomposed, with elimination of methyl alcohol. From these results, the author infers that hydroberberine, like berberine itself, is a tertiary base.

When berberine is heated with methyl iodide and methyl alcohol, it yields a methiodide, $C_{20}H_{17}NO_4,MeI$, in stellate groups of slender needles. On treating this with silver oxide, the corresponding hydroxide is obtained, very similar in its properties to the hydroberberine compound. The platinochloride is a yellow powder.

Fleitmann (*Annalen*, 59, 176) in his paper on berberine mentions the formation of the hydrochloride of a base containing sulphur. The author, following Fleitmann's directions, added yellow ammonium sulphide to a solution of berberine hydrochloride, collected the red precipitate, dissolved it in warm water, and added hydrochloric acid; hydrogen sulphide was evolved, and on examining the solution it was found to contain berberine hydrochloride, but no trace of sulphuretted base. The red precipitate mentioned above is probably a persulphide of berberine.

On treating hydroberberine with iodine, both in chloroform solution, a brownish precipitate is obtained consisting of berberine hydriodide, $C_{20}H_{17}NO_4,HI$. It is easily purified by crystallization from dilute alcohol.—*Jour. Chem. Soc.*, March 1884, p. 339, 340.

NOTE ON THE MELTING POINTS, AND THEIR RELATION TO THE SOLUBILITY OF HYDRATED SALTS.

By William A. Tilden, D.Sc., F.R.S.

In a paper read before the Royal Society last June, and since printed in the Philosophical Transactions, Mr. Shenstone and I drew attention to the relation observable in the solubility of salts in water at temperatures above 100°, and the melting points of the same salts in the anhydrous state. This relation may be exhibited by representing the solubilities graphically in the usual manner, when it is noticed that the curves of solubility of the most fusible turn up most rapidly, whilst the solubility of those less fusible increases nearly in proportion to the temperature, and the curves therefore approach a straight line. This is well seen in the case of two such salts as potassium chloride and potassium chlorate, or sodium chloride and potassium nitrate.

Feeling satisfied that the connection between fusibility and solubility observed in the salts referred to would be found to exist in other cases, I have lately been inquiring into the points of fusion of hydrated salts and their solubility below these temperatures. Very few of the melting points of salts containing water of crystallization could be found recorded, and I have therefore had to make a number of experiments. For assistance in this, and in the determination of solubility in a few cases, I am indebted to Mr. George Lloyd, lately a student in the Mason College Laboratory.

The melting points were ascertained in the following manner: Near to one end of a piece of tubing, drawn out very thin, and about a millimeter in diameter, a narrow strip of moist filter-paper was introduced, and the end then sealed. The tube was then bent twice at right angles, and into the upright open end was droppd a small clear crystal or fragment of the crystal of the salt, and the tube was then attached to a thermometer. Some preliminary trials having indicated the melting point of the salt within a few degrees, the thermometer and tube were stirred round in water or sulphuric acid a little below that temperature, and contained in a beaker placed over a lamp. The object of the damp paper at the bottom of the tube is to supply water-vapor, and so diminish the tendency of the salt to effloresce.

In many cases the melting point can be thus determined within half a degree, but though several experiments were made in each case,

the observations make no pretence to great accuracy. This is due chiefly to the fact that many salts are resolved into a mixture of liquid and solid, and the temperature at which this occurs is sometimes difficult to observe. The fact is these salts seem to be incapable of entering into true fusion, the partial liquefaction being the result of the formation of a crystalline hydrate containing a smaller proportion of water. This happens notably with the sulphate of zinc, cobalt, nickel and iron. On the other hand, there is often no sign of dissociation, as in the alums and many other salts, if the experiment is carefully performed. Of the following salts, the melting points have been given in two or three cases by other observers, but, except where an authority is mentioned, I have verified them all.

Simple Sulphates.	m. p.
$MgSO_4,7H_2O$	70°
$ZnSO_4,7H_2O$	50°
$CoSO_4,7H_2O$	96—98°
$NiSO_4,7H_2O$	98—100°
$FeSO_4,7H_2O$	64°
$MnSO_4,5H_2O$	54°
$CdSO_4,\frac{8}{3}H_2O$	D[1]
$CuSO_4,5H_2O$	D
$Al_2(SO_4)_3,18H_2O$	D
$Na_2SO_4,10H_2O$	34°
Double Sulphates.	
$KAl(SO_4)_2,12H_2O$	84·5°
$NH_4Al(SO_4)_2,12H_2O$	92°
$NaAl(SO_4)_2,12H_2O$	61°
$RbAl(SO_4)_2,12HO$	99°
$CsAl(SO_4)_2,12H_2O$	105—106°
$KCr(SO_4)_2,12H^2O$	89°[2]
$Co(NH_4)_2(SO_4)_26H_2O$	D
$Ni(NH_4)_2(SO_4)_2,6H_2O$	D
$NiK_2(SO_4)_2,6H_2O$	D
$MgK_2(SO_4)_2,6H_2O$	D
$Mg(NH_4)_2(SO_4)_2,6H_2O$	D
Chromate.	
$Na_2CrO_4,10H_2O$	23°(Berthelot)
Arsenate.	
$Na_2HAsO_4,12H_2O$	28°
Phosphate.	
$Na_2HPO_4,12H_2O$	35°
Phosphate.	m. p.
KH_2PO_4 (anhydrous)	96°
Chlorides.	
$BaCl_2,2H_2O$	D
$SrCl_2,6H_2O$	112°
$CaCl_2,6H_2O$	28°
Carbonate.	
$Na_2CO_3,10H_2O$	34°
Oxalates.	
$H_2C_2O_4,2H_2C$	98·5°
$(NH_4)_2C_2O_4,H_2O$	D
Acetates.	
$NaC_2H_3O_2,H_2O$	58·5°
$Cu(C_2H_3O_2)_2,H_2O$	D
Borate.	
$Na_2H_2B_4O_8,9H_2O$	75·5
Theiosulphate.	
$Na_2S_2O_3,5H_2O$	48·5
Nitrates.	
$Ca(NO_3)_2,4H_2O$	44° (Ordway)
$Mg(NO_3)_2,6H_2O$	90° "
$Ni(NO_3)_2,6H_2O$	56·7° "
$Cd(NO_3)_2,4H_2O$	59·5° "
$Zn(NO_3)_2,6H_2O$	36·4° "
$Mn(NO_3)_2,6H_2O$	25·8° "
$Ca(NO_3)_2,6H_2O$	26·4° "
$Cu(NO_3)_2,3H_2O$	114·5° "

[1] D = gives off its water without melting.

[2] Converted into green salt.

The temperatures given above, at which incipient fusion occurs, are in many cases the temperatures at which the turning point in the curve of solubility occurs. It appears therefore probable that the crystallized hydrates, even when in solution, are completely dissociated within comparatively narrow limits of temperature. One of the most striking examples is of course sodium sulphate, but similar phenomena are exhibited by sodium carbonate and chromate, and by manganous, ferrous and other sulphates. This dissociation must also be the cause of the fact that the solubility at or about the melting point of so many salts is less than would be otherwise expected. It must, however, be pointed out that salts like sodium sulphate and phosphate, which may be melted in their water of crystallization, are miscible with water at the same temperature in all proportions, in other words the solubility of the crystallized salt is infinite. Hence there must be something wrong in some of the recorded solubilities of such salts at these temperatures.

If we take from the list salts which are isomorphous with one another and contain the same amount of water of crystallization, and which alone are comparable among themselves, we find that the solubility and fusibility stand in the same order at all temperatures below the point of fusion or dissociation of the hydrate.

The following are examples:

The solubility is taken to be the weight of crystallized salt dissolved in 100 parts of water:

Zinc and Magnesium Sulphates.

	m. p.	Solubility at 0°.	40°.	50°.
Zinc	50°	115·2	224	263·8
Magnesium	70°	72·4	178	212·6 (at 49°)

Alums.

	m. p.	Solubility at 0°.	17°,	20°.	50°.
Sodium	61°	110	....	.....	.....
Potassium	84·5°	3·9	.....	15·13	44·11
Rubidium	89°	.....	2·27	(Redtenbacher, *Watts's*	
Cæsium	105—106°	.....	0·619	*Dict.* [5], 580–583.)	

Sodium Arsenate and Phosphate.

	m. p.	Solubility at 0°.	20°.
Arsenate	28°	17·2	140·7 (at 21°)
Phosphate	35°	6·5	27·2

Calcium and Strontium Chlorides.

	m. p.	Solubility at 0°.	40°.
Calcium	28°	165·7	7,141·0
Strontium	112°	106·2	205·8

Information is yet wanting as to the solubility of many of the salts in the list.

It is of course not maintained that fusibility is the sole cause of solubility, for amongst the commonest phenomena of solution are very many difficulties which cannot be explained away. But there can be no doubt that fusibility and solubility are closely connected together, and I have ventured to bring the subject under the notice of the Society because it can scarcely be advanced any further till a much greater store of experimental data has been accumulated.—*Jour. Chem. Soc.*, July, 1884, p. 266.

QUININE AND HOMOQUININE.[1]

By O. Hesse.

I. Quinine.

The question, formerly raised repeatedly, whether quinine occurs in other barks than those of the genus *Cinchona*, I was able to answer in the affirmative in 1871, when I showed that a bark at that time coming into commerce and erroneously sent out as a cinchona bark,—the china cuprea, which we now know to be derived from *Remijia pedunculata*,—actually contained this alkaloid.[2] My priority in this discovery has indeed been contested, in that J. E. Howard has stated[3] that already in 1857 he had observed this bark in the London market and found it to contain quinine, although he had published nothing respecting it. But since Howard only a short time previously (November, 1869,) had afresh affirmed to the quinologist Weddell[4] the experimental law at that time generally held to be correct, that the cinchona alkaloids were peculiar to the cinchonas only, it may be as-

[1] From the *Annalen der Chemie*, ccxxv., 95.

[2] *Berichte*, iv., 818; *Am. Jour. Phar.*, 1872, 213.

[3] *Neues Jahrbuch f. Pharm.*, xxxvi., 296; Flückiger, "Die Chinarinden," 1883, 43.

[4] *Uebersicht d. Cinchonen*, Weddell, 7.

sumed that Howard first had his attention drawn to the presence of quinine in the bark in question by my discovery, which Flückiger had communicated to him privately.

Far more important than this point is the question whether the alkaloid of cuprea bark then spoken of as quinine was quinine, or only an alkaloid similar to it, homoquinine. Notwithstanding that at the time I found the alkaloid in question to correspond in every respect with quinine obtained from true cinchona bark, I have once more examined the original cuprea bark in connection with my experiments upon homoquinine, the former results being confirmed most completely. Subsequently, also, it was pointed out by me that in cuprea bark quinine is not accompanied by cinchonidine, which has equally been since confirmed by D. Howard and others. On the other hand, according to my observation, quinine is always present in cuprea bark, although the quantity is sometimes relatively very small.

The constant occurrence of quinine in cuprea bark and the persistent absence from it of cinchonidine is so far of special interest that it has been assumed in several quarters, especially by J. E. Howard,[1] that the plants in their development and growth are capable of converting quinine and cinchonidine into one another. Of course in order to make this conversion perceptible certain influences on the development of the plants or their cultivation at different altitudes are required. Nevertheless, the assumption of such a change as this during the development and growth of the plant proves faulty, since if such a conversion actually took place under the conditions named, it would certainly be possible to discover a sample of cuprea bark in which at least traces of cinchonidine would be present.

Although I am in the position to detect the smallest traces of cinchonidine with quinine, all the experiments made in this direction with cuprea bark, as well as with quinine obtained from that bark, have remained without success, a result that justifies me in saying that the formation of the quinine within the plant takes place quite independently of the cinchonidine.

On account of the absence of cinchonidine it is very easy to prepare pure quinine sulphate from cuprea bark. This has normally, whilst yet uneffloresced, the composition represented by the formula $(C_{20}H_{24}N_2O_2)_2, SO_4H_2 + 8H_2O$, like the similarly pure salt obtainable from

[1] *Pharm. Journal*, [3], xiii, 1013; *Am. Jour. Phar.*, 1883, 520.

cinchona barks.[1] The possibility is not, however, excluded that the commercial sulphate obtained from cuprea bark may contain somewhat less than eight molecules of water of crystallization, not only because it has effloresced more or less, but also because it contains an admixture of homoquinine.

II. Homoquinine.

The occurrence in cuprea bark of a special alkaloid, similar in many respects to quinine, was announced simultaneously, in December, 1881, by D. Howard and Hodgkin, Paul and Cownley, and G. Whiffen,[2] the alkaloid being named by the first two chemists "homoquinine," and by Whiffen "ultraquinine." The name "cupreine" has also been suggested for it. This same alkaloid was also observed by one of my colleagues a year earlier; but he considered it to be cinchonidine until June, 1881, when he became aware of the error.

According to Tod the alkaloid in question first appeared in cuprea bark in September, 1880, but only in a few specimens of bark; its occurrence first became almost general in May, 1881. The amount of homoquinine in the bark in many cases reached 0·3 per cent., in some

[1] With respect to the remark of Flückiger upon this salt ("Die Chinarinden," 1883, p. 55), that "it is not established whether this salt contains seven or eight molecules of water of crystallization, or possibly a quantity lying between the two," I may say that more than twenty years since (*Annalen*, cxix, 361) it was shown by Jobst and myself that the formula $(C_{20}H_{24}N_2O_2)_2, SO_4H_2+7H_2O$, for quinine sulphate, is incorrect. On the other hand, it is not so easy to say whether the sulphate in question contains seven and a half or eight molecules of H_2O. A series of experiments, however, carried out by me with every precaution, showed that pure uneffloresced sulphate may actually contain eight molecules of water of crystallization. In that case the formula attributed to quinine sulphate by Robiquet about fifty years ago would be correct.

Undoubtedly the commercial sulphate may contain generally less water than is required by the formula $(C_{20}H_{24}N_2O_2)_2, SO_4H_2+8H_2O$, and for this reason, that in manufacturing operations it is almost impossible to prepare it dry and avoid at the same time the occurrence of a partial efflorescence of the salt. Quite apart from the fact that in certain quarters a smaller amount of water (for instance, 14·4 per cent.) in quinine sulphate is required, it should not be overlooked that a commercial sulphate corresponding to the legally prescribed tests of the German Pharmacopœia may sometimes contain quite a considerable quantity of cinchonidine sulphate (*Annalen*, ccv, 222), upon which a deficiency in water of crystallization may equally depend.

[2] *Pharm. Journ.*, [3], xii, 497, 528, 565; *Am. Jour. Phar.*, 1882, 75.

0·5 to 0·6 per cent. According to Whiffen the cuprea bark examined shortly before the publication referred to contained 0·1 to 0·8 per cent. of the alkaloid, and he believed that in greater or less quantity it was to be met with in every cuprea bark. Paul and Cownley first observed it very frequently four months before their communication (consequently first in August, 1881). D. Howard, who appears not to have observed it so frequently as Paul and Cownley, states that the quantity of homoquinine in the barks in question amounted to about 10 per cent. of their quinine contents, consequently to about 0·2 per cent. Finally to complete the history of our alkaloid it may be mentioned that Wood and Barret[1] were unable to observe this alkaloid in several hundred specimens of cuprea bark which they examined specially for the purpose, and they believed that it might be a compound of quinine with conchinine.

With respect to this latter point, my examination of the alkaloid prepared by Tod, as well as of some kindly supplied to me by Paul and Cownley, has shown that this material is free from conchinine. Moreover the statement made by Whiffen, as well as those of Howard and Hodgkin, point to the same conclusion, so that the opinion of Wood and Barret referred to would appear to be without support, quite apart from the fact that I have been unable to obtain any such compound of quinine and conchinine in working according to the directions originally given by those chemists.

All the above-named chemists who have indicated the existence of homoquinine in one way or another are unanimous that the alkaloid in question forms with sulphuric acid a neutral salt rather difficultly soluble in cold water; it is presumed consequently that it would be necessarily mixed with quinine sulphate prepared from the particular bark, since it would not be separated or altered in any way during the manufacture of quinine.

According to my experience the best method of separating homoquinine from such a mixture is by dissolving it in dilute sulphuric acid, precipitating the alkaloids with ammonia and at once shaking them out with ether, from which after a short time the homoquinine separates out in crystals. The crystallized homoquinine, after being separated as completely as possible from the mother-liquor, is redissolved in dilute sulphuric acid, and again precipitated with ammonia

[1] *Chemical News*, xlv, 6; *Am. Jour. Phar.*, 1882, 75.

and taken up with ether, which quickly deposits the alkaloid in crystals. This operation is repeated as often as may be necessary, but generally a second recrystallization of the base in this way suffices to separate any admixture of quinine.

On a previous occasion,[1] I had, upon the basis of the results of analyses I and II, which were before me at the time, represented homoquinine by the formula $C_{19}H_{22}N_2O_2$. But in the course of this investigation it has given weighty evidence in favor of the formula $C_{20}H_{24}N_2O_2$, with which, moreover, analysis IV, made by me only recently with well crystallized material, corresponds very well. Before analysis the substance was dried at 120° to 125° C.; it then gave:

I. 0·2154 gram 0·5820 CO_2 and 0·1420 H_2O
II. 0·2436 gram 0·6535 CO_2 and 0·1555 H_2O
III. 0·2453 gram 0·6660 CO_2 and 0·1585 H_2O
IV. 0·2613 gram 0·7095 CO_2 and 0·1765 H_2O

	Calculated for $C_{19}H_{22}N_2O_2$	Calculated for $C_{20}H_{24}N_2O_2$	Found. I.	II.	III.	IV.
C.	73·54	74·07	73·73	73·16	74·04	74·05
H.	7·09	7·41	7·35	7·09	7·17	7·50

From ether containing water homoquinine separates, if undisturbed, partly in concentrically grouped needles, partly in stout decided prisms, derived from the rhombic system, terminating at the ends in a dome, the crystals being sometimes isolated and sometimes a few concentrically aggregated together. In a disturbed crystallization, on the other hand, according to the degree of concentration of the solution, either a sandy powder or a crystallization consisting of delicate lamellæ is obtained. In all cases it contains water of crystallization, the quantity varying between 2 and 2½ molecules, a part of which is readily given off at 80° to 100° C., and the remainder first at 120° to 125° C.

I. 0·2438 gram gave at 120° to 125° C. 0·0284 H_2O
II. 0·2784 gram gave at 120° to 125° C. 0·0303 H_2O
III. 0·2500 gram gave at 120° to 125° C. 0·0260 H_2O
IV. 0·2733 gram gave at 120° to 125° C. 0·0273 H_2O
V. 0·2935 gram gave at 120° to 125° C. 0·0322 H_2O
VI. 0·6085 gram gave at 120° to 125° C. 0·0710 H_2O

	Calculated for $C_{20}H_{24}N_2O_2+2H_2O$	Calculated for $C_{20}H_{24}N_2O_2+2\frac{1}{2}H_2O$
H_2O	10·0	12·19

Found I.	II.	III.	IV.	V.	VI.
11·65	10·88	10·40	10·00	10·97	11·66

[1] *Berichte*, xv, 857; *Am. Jour. Phar.*, 1882, 364.

Crystals of homoquinine exposed to the air gradually become dull through efflorescence; in the more compact crystals, however, the amount of water never falls below 10 per cent.[1] They can be exposed directly to a temperature of 100° C. without any fear that they will fuse, like, for instance, crystallized quinine trihydrate. At that temperature the alkaloid loses only a portion of its water of crystallization; it first melts at 170° C., forming, upon cooling, a colorless amorphous mass.

Homoquinine dissolves in ether with somewhat more difficulty than quinine; its solution does not gelatinize upon evaporation of the ether, but crystallizes up to the last drops, if the ether be absolutely free from alcohol. In chloroform it dissolves readily, but with more difficulty in benzol and very slightly in light petroleum spirit. Alcohol dissolves it freely and leaves it upon evaporation in the amorphous form.

The alcoholic solution of homoquinine tastes intensely bitter and has a strongly basic reaction; it neutralizes hydrochloric and sulphuric acids perfectly. Its solution in an excess of dilute sulphuric acid shows a blue fluorescence, which is dispelled by sodium chloride and other haloid salts. Hydrochloric acid also removes this appearance, and a solution of the base in hydrochloric acid shows no fluorescence. These solutions rotate the plane of polarized light to the left; they give upon the addition of chlorine water or hypochlorite of lime and excess of ammonia a dark green color, like quinine.

With acids homoquinine forms neutral and acid salts, which, so far as they have up to the present been examined, correspond in their behavior towards precipitants, such as sodium hydrate and carbonate and ammonia, with the corresponding quinine salts; on the other hand, they differ from them in their form and partially in their greater solubility. On account of insufficiency of material I have only been able to deal at all exhaustively with the following salts:

Neutral Hydrochlorate of Homoquinine is obtained by neutralization of an alcoholic solution of the alkaloid with hydrochloric acid. Upon evaporation of this solution an amorphous residue is left that

[1] The substance obtained in delicate lamellæ effloresces very rapidly, and frequently after a few hours the quantity of water of crystallization amounts to only about 6 per cent. This phenomenon may probably be partially due to the larger surface which the lamellæ have as compared with the more compact crystals.

dissolves readily in water. The aqueous solution leaves again upon spontaneous evaporation an amorphous residue.

Acid Hydrochlorate of Homoquinine is obtained upon adding some hydrochloric acid to a concentrated aqueous solution of the neutral hydrochlorate; the acid hydrochlorate separates at once in stout colorless prisms, which dissolve pretty freely in water, but less readily in hydrochloric acid.

Acid Chloroplatinate of Homoquinine.—Upon mixing an aqueous solution of the previous salt with platinum solution a pale yellow flocculent precipitate results, which almost immediately is re-arranged in small orange-red prisms. The salt contains water of crystallization that is first given off at 120° C.

Hydrosulphocyanide of Homoquinine is obtained upon mixing a solution of the neutral hydrochlorate with potassium sulpho-cyanide. It is amorphous, dissolves slightly in cold water, but more freely in hot water and in alcohol.

Neutral Sulphate of Homoquinine is obtained upon saturation of hot dilute sulphuric acid with the base. Upon cooling of the solution the sulphate crystallizes in short six-sided colorless prisms, which being very brittle are broken more or less in collection. The salt dissolves in about thirty parts of boiling water, very slightly in cold water, freely in boiling alcohol, and is nearly insoluble in chloroform and ether.

Samples prepared on different occasions gave upon analysis the following results:

I. 0·2490 gram gave at 120° C. 0·0333 H_2O.
II. 0·4848 gram gave at 120° C. 0·0608 H_2O.
III. 0·3300 gram gave at 120° C. 0·0420 H_2O and 0·0925 SO_4Ba.
IV. 0·2243 gram gave at 120° C. 0·0293 H_2O.

	Calculated for $(C_{20}H_{24}N_2O_2)_2,SO_4H_2+6H_2O$.	Found.			
		I.	II.	III.	IV.
H_2O	12·64	13·37	12·50	12·85	13·01
SO_3	9·37	...	...	9·62	...

The crystals of this salt effloresce superficially in air, and become consequently dull; the loss of water is, however, not worth notice. Even after a considerable time the water of crystallization amounts still to 12·50 per cent. On the other hand, quinine sulphate exposed to exactly the same conditions would at the end of a couple of hours have fallen to a powder, and would then contain only 4·2 to 4·6 per cent. of water. If the two sulphates, dehydrated at 120° C., be exposed

to moist air, the quinine sulphate rapidly takes up 4 per cent. of water, but the homoquinine almost three times as much, namely, 11 to 12 per cent.

It was of especial interest to acertain the behavior of homoquinine to polarized light, since the alkaloid on account of this behavior received from Whiffen the name "ultraquinine." According to Whiffen this sulphate in acid solution showed $(a)_o = -221°$, whilst quinine sulphate only showed $(a)_o = -196°$. Of the water of crystallization of the two sulphates, in which they certainly differ from each other, Whiffen makes no mention, so that it is quite possible that the difference in question was purely dependent upon the different quantities of water of crystallization which they contain.

In my experiments the amount of water of crystallization was first exactly estimated, and then a quantity of each of the hydrated sulphates corresponding to 1·25 gram of anhydrous salt was dissolved in 10 cc. of normal hydrochloric acid. These solutions were then each diluted with water up to 25 cc., and finally examined at $t=50°$ and $l=220$, the deviation being sometimes determined first by means of the quinine solution, and then this solution changed for the homoquinine solution, and sometimes the order being reversed. In this way it was ascertained that *the two solutions did not differ from one another in respect to their optical behavior.* In an average of thirty determinations $a = 25·92°$, which gives for the anhydrous sulphate $(a)_o = -235·6°$.

Neutral Tartrate of Homoquinine is obtained by mixing a hot aqueous solution of the sulphate with solution of Rochelle salt. It forms delicate white concentrically grouped needles, which dissolve with some difficulty in hot water and are very slightly soluble in cold. The composition of the salt is represented by the formula—

$$(C_{20}H_{24}N_2O_2)_2, C_4H_6O_6 + 2H_2O.$$

0·3305 gram of air-dried substance gave at 120° C. 0·014 H_2O.

	Calculated for	Found.
H_2O	4·31	4·23

The tartrate dried at 120°C., takes up from moist air only 1 molecule of H_2O; it has then the same percentage composition as neutral tartrate of quinine.

The dissimilar composition of the two tartrates must not be overlooked in the estimation of quinine optically by the method of Oude-

mans, jun.,[1] otherwise, up to about 4 per cent. of cinchonidine sulphate might be "found" in a quinine sulphate, obtained from cuprea bark in which not a trace was present. This mistake may, however, be easily avoided, by previously determining the amount of water in the tartrate, and as I have done in my optical quinine test,[2] starting from the anhydrous salt.

III. Conversion of Homoquinine into Quinine.

Some observations which I made during the investigation of cuprea bark agreed pretty well with the presumption that under certain conditions homoquinine might change into quinine. To ascertain these conditions I first heated the alkaloid to 100° C. with dilute hydrochloric or sulphuric acid, sometimes in open vessels and sometimes in closed tubes, but without result. Hydrochloric acid of specific gravity 1·125 acted no better; but upon heating the latter solution some hours to 140°C., methyl chloride and apoquinine were formed, as with quinine. Nevertheless, I was unable to separate quinine from this solution by means of ammonia before this formation took place. If, however, soda lye were used for the precipitation of the alkaloid, a certain quantity of quinine now resulted. In consequence of this observation I was now able, by repeated precipitations with soda lye, shaking the precipitates with ether, and this solution with very dilute sulphuric acid, to convert homoquinine completely into quinine. The conversion is essentially accelerated by heating the base with soda lye, a previous heating of the acid solution being thereby made unnecessary.

From the quinine obtained through conversion of homoquinine the neutral sulphate was prepared, which gave

I. 0·5425 gram at 120° 0·0893 H_2O.
II. 0·7320 gram at 103° 0·1170 H_2O.
III. 0·4625 gram at 120° 0·0720 H_2O.

Calculated for	Found		
$(C_{20}H_{24}N_2O_2)_2,SO_4H_2+8\ H_2O$	I.	II.	III.
H_2O . . 16·17	16·46	15·97	15·54

This salt effervesced rapidly in dry air and then contained still 2 molecules of H_2O. On the other hand, the dried sulphate quickly took up 4 to 4·6 per cent. of water.

[1] *Annalen*, clxxxii, 65.
[2] *Annalen*, ccv, 217.

In other respects also no difference could be recognized from the known pure sulphate.

IV. Concluding Remarks.

The foregoing results justify the conclusion that Barret and Wood in their investigation converted the homoquinine into quinine and that it thus escaped observation by them. I myself also had previously fruitlessly endeavored to prepare the alkaloid in question from cuprea bark. It was only after a series of English chemists had simultaneously affirmed the existence of homoquinine that I felt I ought to drop my doubts as to the peculiarity of the alkaloid, which was at any rate first prepared by Tod; but up to that time I had considered the substance in question to be none other than *crystallized quinine.*

Upon the grounds stated my original opinion as to the nature of this substance might still be correct. It is true that at present I have not yet succeeded in preparing homoquinine from cinchona bark, and it may be there is no present prospect that it is obtainable from that bark, so that this substance may still pass as characteristic of the *Remijia pedunculata,* which yields the cuprea bark. But I might maintain to the contrary that I formerly had the opportunity of being able to point out that quinine under certain conditions would become modified, in that it passed into the anhydride, and that this substance also *behaved as a special alkaloid.* At that time also I succeeded in reconverting this substance into ordinary quinine through prolonged treatment with dilute sulphuric acid, though not through precipitation with soda lye.[1]

Besides this modification of quinine there exists at least one more, which forms with sulphuric acid a neutral sulphate that separates from a hot aqueous solution as a jelly, only subsequently assuming a crystalline form.[2] I was formerly inclined to place this peculiarity of the sulphate in question to the account of a coloring substance, concerning which not much was known. Nevertheless, exactly those solutions from which quinine sulphate separates at first in a gelatinous form are so very little colored that the cause of the gelatinization might far rather be sought in the absence of coloring matter. I may also add that in the cases mentioned, if the alkaloid be taken up in ether, the ethereal solution gelatinizes relatively easy. These peculiarities of the

[1] *Annalen,* clxxxvi, 207.
[2] *Annalen,* clxvi, 262.

alkaloid disappear, however, most surely if the sulphuric acid solution be subjected to a prolonged boiling.

The most important results of the foregoing investigations may be brought together in the following propositions:

(1.) Homoquinine is a modification of quinine.

(2.) Cuprea bark in many cases contains this modification together with quinine.

(3.) Several modifications of quinine exist, which by suitable treatment pass into ordinary quinine.

LUKRABO OR TA-FUNG-TSZE.

By E. M. Holmes, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

In the interesting papers on "Chinese Materia Medica," by the late Daniel Hanbury, published in the *Pharmaceutical Journal* ([2], vol. iii., 1862), a seed is described and illustrated under the name of *Ta-fung-tsze*, which he conjectured to be allied to *Chaulmugra*. This seed is largely used in China in skin diseases and leprosy, and appears to have been employed in that country for at least three hundred years, since the tree affording the seed is figured in the old Chinese herbal, "Puntsaou," published A.D. 1596. The tree, however, has up to the present time been unknown to botanists.

The *Ta-fung-tsze* is still an article of considerable commerce, figuring in the Consular Blue Books under Chinese imports by the name of *Lukrabo*. As much as 48 piculs (6,400 lbs.) of the seed were exported from Bangkok to China in 1871. It is also exported thither from Saigon in Cochin China. The seed in question is about half the length of *Chaulmugra* seed, but of equal diameter. The shell is thicker and harder, and at one end is marked with a few radiating slightly raised ridges, whereas that of *Chaulmugra* is quite smooth.

Dr. Porter Smith, in his "Chinese Materia Medica." (1871), p. 140, describes these seeds under the name of *Lucrubau*, and he also considers them as a variety of *Chaulmugra*. He states that they are described in Chinese books as being good for leprosy, lepra, itch, pityriasis, psoriasis, syphilis, lipoma, vermes, and chaps upon the back of the hands, and that calomel and the seeds of *Robinia amara* are used with the *Lucrubau*, both externally and internally, in the treatment of

leprosy. In the northern province of Hupeh the seeds are in great repute as a remedy for parasitic pediculi and the itch insect. In Soubeiran's "Matière Médicale chez les Chinois" (p. 221), the seeds are erroneously referred to *Gynocardia odorata.*

In the Kew Report (1878, p. 33) the seeds, under the name of *Dai-phong-tu,* are said to be used in Saigon as a vermifuge after the extraction of the oil. It is added that M. Pierre has successfully raised some seeds of the plant, and refers it to the genus *Hydnocarpus.* The species, however, is not mentioned in the Kew Report and no further information has appeared in it upon this point in subsequent years. Having had a specimen of the *Lukrabo* seed in the museum of the Pharmaceutical Society for some years—without a specific name—I recently wrote to M. Pierre for information as to the species yielding the seed. In response he has kindly forwarded for the herbarium of this Society a specimen of the plant with flowers and seeds, and the following interesting statement: "It is a new species which I have named *Hydnocarpus anthelminthica,* Pierre. It is very nearly allied to *H. alpina,* Wight, p. 940, but its leaves are more linear-oblong. The scales opposite to the petals are less long and more ciliated, the stigma is furrowed in its whole extent, and is only toothed towards the extremity of its reflexed margin, while in *H. alpina* it is furnished with large lobes. The male flower contains a rudimentary ovary; in the female flower this is pyramidal. The seeds are used as a vermifuge by the Annamites. The names given in Annam to the plant are *Dai-phong-tu* and *Thaoc-phu-tu.* The specimen sent was gathered in the province of Bien Hoa in Southern Cochin China." A figure of the tree will, I presume, be given in the magnificent "Forest Flora of Cochin China," now being published by M. L. Pierre under the auspices of the French Government.

The botanical source of this important eastern drug is thus at last satisfactorily cleared up.—*Phar. Jour. and Trans.,* July 16, 1884, p. 41.

RESORCIN FOR THE RELIEF OF PAIN.—Andeer finds that although resorcin has no benumbing effect upon the normal human skin, yet it has very decided analgesic properties in painful affections of the skin or mucous membranes. He also gives it internally in colic, cardialgia, and painful affections of the larynx, in increasing doses of one to ten gm. and also in the form of clysters (thirty per cent. solution), with satisfactory result.—*Phila. Med. Times,* Aug. 9.

RESEARCHES ON THE DISEASES OF ANIMALS.

By Pasteur and others.

Pasteur's results may be summarized as follows: It is proved by inoculation experiments that both quiet and raving madness originate from the same poison. The symptoms of madness are extremely variable, and depend apparently on the part of the nervous system attacked by the poison. The infectious matter is in the form of microbes in the saliva of mad animals; inoculation with it causes death in three ways, either by microbating the saliva, or by the excessive production of pus, or by the development of madness. The marrow, brain, and spinal cord are always virulent in all animals dying of madness, the virulence increasing until putrefaction sets in. In one case a brain was sustained at a temperature of 12° for three weeks by this action. To produce madness quickly and surely, after trepanning, inoculate in the skin on the surface of the brain; the disease will make its appearance in 6, 8, or 10 days. The malady produced by injection into the blood system exhibits symptoms which differ greatly from those of raving madness caused by a bite or by inoculation after trepanning, and hence many cases of the quiet form may escape observation. In those which may be termed moderate, pronounced paralysis ensues, whilst raving and howling are not observed. When the poison is injected into the blood, the spinal cord seems to be the first point attacked. Injection of saliva or blood from a mad subject into the veins does not protect a dog from a subsequent outbreak of madness, or from death after a second inoculation of mad matter, either by trepanning or injection in a vein. Cases of spontaneous recovery have been observed when early symptoms only were developed, but never after the symptoms became violent. In some cases after they had disappeared they returned after two months, whereupon death followed.

As a great many sheep are lost after protective inoculation for sheep-pock, Peuch has investigated the subject, and from the results of his experiments draws the conclusion that this danger may be greatly reduced by using small quantities of lymph diluted 60 to 120 times.

Thiernesse and Degive have made experiments on protective inoculation for lung epidemics. Their results show that 2 grams of lung epidemic poison may be injected into the veins without danger, provided it does not touch the cell-tissue. Immunity to the same extent

results from this injection as from the tail inoculation recommended by Willems. Immunity in this case is sometimes perfect, and does not cause changes which occur when the disease is taken in the natural way. — *Bied. Centr.*, 1883, pp. 674–677; *Jour. Chem. Soc.*, May, 1884, p. 623.

ACCELERATION OF THE OXIDATION OF DRYING OILS.

By A. Livache.

When a drying oil, previously treated with litharge or finely divided metallic lead is agitated with a solution of zinc sulphate, all the lead is precipitated from the oil, but the latter now holds zinc in solution. By using manganese sulphate, copper sulphate, etc., in this way, every trace of lead is removed from the oil, but the lead is replaced by manganese, copper, etc. If an oil charged with lead will dry in 24 hours when spread out in a thin layer on glass, it will dry completely in five or six hours if charged with manganese, in 30 to 36 hours with copper, zinc or cobalt, and in more than 48 hours with nickel, iron, chromium, etc.

It is more convenient to use the solid finely powdered salt in place of a solution, since the latter forms an emulsion with the oil. In fact, treatment with metallic lead and a solid sulphate may take place simultaneously, but in this case the oil will contain some lead in addition to the other metal.

Although solidification of a drying oil charged with manganese takes place in five or six hours when spread out in thin layers, the solidification of thick layers requires a long time, even though the protecting pellicle which forms on the surface is continually removed. Oxidation is more rapid at a higher temperature, but with thick layers a long time is required for complete solidification, even under these conditions.

A temperature of 50–60° accelerates the oxidation of drying oil, partly because the oil becomes more fluid, and partly because the oxygen is more active at a higher temperature.

When a manganiferous oil is dissolved in an equal volume of benzene, and agitated with air in a closed vessel, rapid absorption of oxygen takes place, especially at a temperature of 40–50°. If the air

is continually renewed, so as to furnish the oxygen required for the maximum oxidation of the oil, the liquid becomes thick, and on distilling and separating the solvent a liquid is obtained which solidifies on cooling to a very dry and perfectly elastic solid. It is evident that by limiting the oxidation a series of products of varying viscosity, can be obtained intermediate between the original oil and the solid formed by maximum oxidation. The last product is characterized by its remarkable elasticity, and its absolute insolubility in water, alcohol, and ether. It is almost instantly saponified by potash in the cold, and on subsequent separation of the fatty acids it is found that the solid fatty acids have undergone no alteration, whilst the liquid fatty acid has almost completely disappeared, and has been converted into viscous products, characterized by their solubility in water and by the various salts which they form.—*Comp. Rend.*, 97, 1311–1314; *Jour. Chem. Soc.*, April, 1884, p. 532.

VEGETABLES USED AS FOOD IN JAPAN.

By O. Kellner.

Vegetables form a large part of the people's food in Japan; the varieties in use are many, and the methods of cooking numerous; some are preserved by simple air-drying; others are made into jams, pickled with sugar or acidified. The soja bean is the foundation of an almost universally used sauce, *Schoyu;* of a vegetable cheese, *Miso;* and of a highly albuminous jelly, *Tofu;* a large number of the plants are indigenous, other peculiar to warm climates, and few have hitherto been submitted to chemical examination. Rice is the largest article of consumption, and of it there are many varieties, all of which are grouped in two divisions: one, the mountain rice grown on dry ground; the other marsh rice, cultivated in irrigated fields, both being botanically the same. Of the marsh rice there are also two principal divisions—ordinary and glutinous rice; the following analyses of dry matter in the three kinds are given:—

	Ordinary.	Glutinous.	Mountain.
Proteïn matter	7·00	5·87	8·75
Fat	2·29	3·44	2·58
Cellulose	4·58	5·19	1·98
Non-nitrogenous extract	84·76	83·89	85·53
Ash	1·37	1·61	1·18

The figures for fat are larger than in other analyses of rice, but the difference is accounted for by the author's samples being undressed grain, whereas the samples examined by other investigators have been of the

dressed and well cleaned commercial article. *Panicum italicum*, a species of millet, is, after rice, the principal food of the poorer classes. *Sorghum saccharatum*, is an introduction from America. *Phaseolus radiatus* is a bean largely cultivated and highly esteemed; it differs but little from the European variety, *Phaseolus vulgaris*.

Canavalia incurva, another sort of bean, is a climber not much cultivated; the pods are about 20 cm. long, bearing 6–8 rose-colored seeds, weighing on an average 2·5 grams each; they have, when ripe, a disagreeble smell, and are generally eaten unripe. *Solanum Melongena*, or egg plant, is largely cultivated, and many varieties of it exist; it is reared from seed, and bears fruit for a long time. The specimen of fruit examined weighed 64 grams; its value as food about equals that of the pumpkin or gourd. Young shoots of the *Bambusa puerula*, and three other varieties of bamboo, are very much in favor. As soon as they appear above the earth in spring, they are dug out and eaten, dressed as asparagus. Different kinds of the sweet potato (*Batatus edulis*) are largely cultivated, and are great favorites; their long succulent stems interlace and cover the soil, keeping it moist. Their deficiency in nitrogen and the small amount of ash compared with other root vegetables, is remarkable.

Dioscorea japonica is of limited cultivation, and used by the wealthier classes. *Arctium Lappa*, the seeds (root?) of one variety, *Ummeda Gobo*, reach an extraordinary size, a length of 1 meter, and circumference of about 30 cm. *Colocasia antiquorum*, the sweet Japanese potato, is extensively cultivated; like the common potato, it is grown from the sliced tubers. *Conophollus Konjak* is a somewhat similar plant; the root is rich in starch; it is used in the preparation of a gelatinous sort of food called konyaku, peeled, dried, and rubbed to powder; milk of lime, or the soluble salts from wood-ash is added to it, and stirred up to a stiff paste; it dries to a clammy mass. *Brassica rapa rapifera*, a turnip, is a favorite food. *Raphanus sativus* is a kind of radish which grows to an enormous size, specimens weighing 2½–3 kilos are not uncommon, and one sort is much esteemed for its sweet taste; the radish is one of the most esteemed vegetable foods of Japan.—*Landw. Versuchs.-Stat.*, 30, 42—51; *Jour. Chem. Soc.*, June, 1884, p. 674.

Use of Helenin.—Dr. Valenzuola has successfully treated troublesome coughs by helenin given in pill form or dissolved in alcohol. He employed it in bronchitis and phthisis, in doses of one-eighth grain in pill ten times a day, or five drops of the tincture three times a day. In every case the cough was moderated, the expectoration was lessened in quantity and became mucuous, and the thoracic pains were greatly mitigated. The drug also increases the appetite and improves digestion. It is possessed of no narcotic properties. Helenin is not a new remedy, for it was known, though but little esteemed, by our fathers.—*Med. Record*, May 31. *El Siglo Med.*

THE P AND THE P.

By J. Winchell Forbes.

By which is indicated the relative importance of the pharmacist and the public. Which is which, depends. In point of number, of course it is the public with a P, but in relation to ourselves, the introductory letter of our profession, like the famous gourd vine, grows clean out of sight, when we stand *individually* in the focus of our mental microscopes, at the same time, dualizing our existence, and occupying a position at the eye-piece.

The application of time and study to the details of a given art or science, inevitably leads to more or less idealization of those details, and, no matter how primary they may be in reality, a more or less exaggerated estimate of their importance.

In fact, the more purely practical and devoid of real scientific nature they are, the greater the exaggeration, and we find a more thorough *esprit de corps* among the lower grades of mere artisans than among those in whose work mental processes and scientific considerations enter as a portion of the details. To the journeyman tailor or shoemaker his *guild* is the object of a species of worship, and, as a rule, his own individual existence is as an *unit* of the aggregation. His affection is centered upon his *trade*, not upon himself. His possible acquirements in that trade are self-limited, mechanical dexterity cannot transcend the point of practical perfection, and, as hundreds of his fellow-workmen reach that point as well as himself, he is constantly brought face to face with the fact that he is not eminently superior to his associates.

The moment that he outsteps the conventional ruts, and, introducing a mental element, becomes an *originator*, the first blow is struck at the supremacy of the *guild* over the *individual*, and the greater the proportion of *mental* action, the stronger the feeling of *individuality*, and the less disposed is he to be content with a degree of personal importance that is a common quantity for *all* units of the aggregation forming his guild.

It is rarely that *foremen* are found among the *strikers*.

Intelligent appreciation of a well-made piece of machinery, or *any* result of purely mechanical processes, is possible to the most rudimentary organizations; no knowledge whatever is required of the details of production, or even of the *utility* of the result.

The contemplation of a complicated piece of machinery will give pleasure, even when the observer cannot tell whether its mission is to grind wheat or make pins. The coloring, grouping and general execution of a painting is capable of eliciting commendation from persons having no practical knowledge of drawing, color-mixing or any point that underlies the success of the artist. Appreciation in such cases is the result of *immediate perception*, involving neither past nor present mental effort.

The results obtained by labor in arts and sciences that are distinct and wholly apart from the environments of every-day life *cannot* meet with appreciation by immediate perception, and are therefore unintelligible to the ordinary individual.

The Science of Chemistry, as well as the Art of Pharmacy, furnishes *such* results. For the appreciation of their value and significance a definite mental operation is required, not only with reference to a given case for immediate consideration, but that operation is but the continuance of *previous* mental labor, a weighing of the matter as it were in the scales of experience.

It is not to be expected, therefore, that the labors of either the chemist or the pharmacist will be correctly valued by the mass. The laborers in the abstract mathematical sciences, astronomy, physics, and those of similar nature, are isolated from the world; and the great public, while perhaps viewing their labors as but little better than air-castle building, still recognizes the fact that such matters are without the scope of their comprehension, do not "like fools rush in," and laborers in these fields never are obliged to combat what Tyndall very tersely designates "the confidence of half knowledge."

The boundary line between the workers and the "outside barbarians" is sharp and distinctly marked, and there is little or no trespassing.

In the case of pharmacy it is unfortunately very indistinct, and probably more evil results flow in our profession from "half knowledge" than in any other except that of the practice of medicine. It is this very half knowledge on the part of incipient pharmacists and doctors, as well as among the masses, that leads to the general idea, that the "druggist is half a doctor," and that the doctor is an adept in pharmacy.

No sooner does the future pharmacist succeed in making a saleable batch of paregoric than he feels himself qualified to prescribe for any one well enough to drag themselves to the drug store for *cheap* (?) treatment, and, if naturally of a vivid imagination, feels called upon to contribute of his experience to the columns of a journal. "Old heads" know that *new facts are scarce*, and that a column of nonpareil in an ordinary journal means a vast amount of previous work, much interlining, and many important corrections; possibly, also, a wish by the writer after posting that he had waited till he was a little more certain of his results.

Bunsen has said, "It is only the inexperienced analyst that never doubts his own work," and J. Lawrence Smith's recent protest against infinitesimal weighings is but its reiteration in another form. The managers of the various journals well know that original contributions from experienced workers are far from easy to obtain, even when *paid* for at the usual rates. Were it not for the *reputation gained* by the publication of an original investigation, containing points of immediate interest to the profession, or in some instances a desire to benefit the world, very few would take the trouble to arrange matter distributed through many pages of "notes" in a form suitable for publication. It is one thing to write an *effusion* like the present article, and quite another to put in shape one composed of *facts and their relations.* But editors must have "copy," and to them an intelligent case of *cacoethes scribendi* is a God-send.

Now, I do not wish to be misconstrued. I do not in the least disparage the value of the "students'" column, but I do protest against the publication of some answers to "queries" that I have seen in the journals; in

which *ethical* questions are decided by persons whose immature age disqualifies them from forming an *intelligent* judgment. Age, and quantity of work, among the details that are under consideration, can *alone* furnish the varied experience requisite to determine a question of ethics in relation to pharmacy or *anything else*, and more than usual care should be exercised in allotting queries of that nature. But this is in some measure digressive.

The line bounding the duties of the pharmacist on one side overlaps that of the physician, and through his *trade* connection on the other side, that of the public. The inexperienced pharmacist, as well as the immature physician, finds it difficult to segregate the points in the overlap that constitute his portion, and in such cases there is a constant outstepping of province, with a feeling of resentment at aggression on both sides.

The customer at the prescription counter can see no reason why he cannot manipulate the pestle, or apportion the powders, as well as the pharmacist, and, in the case of mixtures, "anybody can pour a liquid into a bottle." This assumption of *competency* on the part of the average individual is exemplified in the demand for "English labels." The young man entering a drug store is a true member of the public, and his first and most disagreeable task is to learn that he is *not* competent. The less conceited and self-opinionated he is the sooner he becomes really a pharmacist. There are some natures, however, naturally imbued with a distaste for labor that is not productive of immediate and tangible pecuniary results. Such can never, except in cases of exceptional mental ability, rise above the level of mere tradesmen, and we have a class of apothecaries differing from the general public only in the point of greater thickness in the skin of their special knowledge. It is to these *hybrids* that our profession must charge many of the impediments placed in the way of elevating the standard of our profession. No act of theirs ever intimates to the public that the profession of pharmacy requires any more intelligence than the engineering of a peanut stand. They will cull from the various journals, or perhaps "patent outside" newspapers, formulas for a "blood purifier," cough syrup, horse powder, etc., and offer them to the world as the most "wonderful discoveries of the present age." In this connection, the efforts of certain houses at supplying apothecaries of this class with ready-made clothes (I beg pardon, I forgot; they keep drug, not tailor shops), I mean ready-made patent medicines, in form though not in name, is a direct blow at the advancement of pharmacy. This is a far greater evil than the identification of a certain remedy with a given house, as exemplified in ordinary patent medicines. It places the pharmacist directly upon the same plane as the vender of sugar or coffee, or in fact below, as he becomes simply an irresponsible dealer in sealed packages. The patent medicine man *may* have spent years of time and a large amount of money in perfecting his remedy, or he may not have spent either. He has the benefit of the *doubt*. The apothecary, however, that deals in this class of remedies has no such benefit. We *know* that the only time and thought expended is in driving a purely commercial bargain, and he is entitled to no more consideration as a scientist than the boy that sells a pound of old

iron. Such people are emphatically "of the public, publicly." And yet can we fairly blame them? No one can be blind to the fact that money makes the wheels of life revolve smoothly, and that the man with forty cents is of more consequence in the eyes of the world, and fair woman, than he who has only twenty-five. One has his choice between ignorance with strawberries and cream, and learning with oleo-margarine.

It is an unfortunate, but not to be disputed fact, that the *mere tradesmen* have been the most financially successful. The most favorable prospects exist for a newly opened Pharmacy, when a sharp dividing line is drawn between the two P's, one individual dealing wholly with matters of financial nature, and another wholly with the scientific minutiæ. The realization of the highest degree of perfection in the conditions, necessitates the possession by both parties, of integrity, and more than ordinary general education. The conditions existent in such a case, are realized in an eminent degree, so far as pertains to mere duties, in the large watch factories. Each operator confines himself to the performance of certain acts, and the daily repetition of these acts, under constant environments, ensures the greatest perfection in their performance. Not only that, but each operator naturally gravitates to the class of acts for which he is best fitted, and the amount of combined error, through *personal equation* is reduced. The application of these principles to the ordinary retail pharmacy, although usually difficult, does not infrequently occur, and when the possession of a high degree of ability by both parties in their peculiar provinces, is supplemented with the requisite conditions of temperament and integrity, the confidence of the general public is obtained, so to speak, without an effort, the success in a monetary sense is almost certain, and the personal relations of the parties are of the most satisfying character. The manifestations of confidence in the competence of the scientific partner, by the one manipulating the nimble sixpence, has great weight with those who bring grist to their mill; but when, on the other hand, the financial manager assumes to pass judgment upon pharmacal matters, he at once becomes an object of ridicule and diverts custom from his counter. Thinking people prefer to *take chances* of incompetency at an *unknown* pharmacist's hands, to the dead certainty of incompetence in the one they *do* know. This is an age of education, although it has not been unaptly styled the "Age of Brass," and although the mass struggling in the mad race for wealth, is always ready to claim the stray penny, and the odd half-cent, the growth of general intelligence in the public brings with it the knowledge that good articles are worth more than inferior ones, that a *shiny* five dollar gold piece will buy no more than a dull one, and that shiny or dull, a five dollar piece cannot be bought for nine silver half dollars, or even four hundred and ninety-nine copper cents. We must admit, however, that the *shiny* piece has great attractions for those unable to distinguish between gold and brass, and to carry the simile into pharmacy, there *are* instances of a "shiny" business figure-head and a *lead* pharmacist; oftenest combined in the same individual however, as an investor of capital is very quick in measuring the value of the *brain-work* that should offset his *dollars*, to detect any shortcomings, and to "secede" upon the shortest notice from an union of forces

kinetic only as regards his own portion. Years agone the ways that were dark, of the alchemistical apothecary kept the boundary line between a gaping public and his inner sanctum clear and distinct. The symbols of his art even, were looked upon with awe (scarcely with reverence), he was of the world a thing apart, and like all imperfectly understood lives, that of an apothecary was cruelly misjudged. The crude nature of scientific knowledge at the time precluded all attempts at the rational utilization of observed facts, or the framing of valid inductions, and the *misty* condition of philosophic minds rendered impossible the transmission of intelligence from those minds to the world at large.

We are suspicious *always* of the incomprehensible and the "ways" of an apothecary were eminently so to the masses. Suspicion begets dislike, and it is but a step from negative dislike to *positive* hatred, and positive hatred, not unmixed with fear, was the feeling with which the public of early ages regarded him of the crucible and gallipot. This was the primary relation existing between the two p's.

Following closely the dissemination of knowledge came the appreciation of the fact that the apothecary was not so *black* as the devil said he was, the dividing line between the p's gradually lost its sharp distinction, and to-day we are passing through the *secondary* stage, with a Public feeling that the apothecary is as "other men;" that the fundamental elements of his art are not solely "fire and brimstone," and that his mission is not altogether Satanic. The bow was overbent and its spring has thrown it now too far the other side; the public of years ago claimed *no* knowledge of the art or science of Pharmacy, to-day it assumes *too much*. The shop of the apothecary is no longer the dingy, smoke-discolored den of his alchemistical ancestor, his bottles are no longer labelled with arbitrary symbols of mythical deities, and his operations are no longer conducted under a veil of secrecy, nor aided and abetted by magical incantations. All is "open and above board," except *the knowledge and experience stored away out of sight in the pharmacist's brain.* The dispenser moves about confidently amid the paraphernalia of his art, while his customer, in full view of his actions, waits in an elegantly furnished room, the completion of a very simple operation, and *grumbles at the price.*

Canova once made a bust for a wealthy plebeian, and charged him three hundred florins.

"Why, exclaimed the plebeian, you made it in a week."

"True, said Canova, but it has taken me thirty years to *learn* to do it in that time."

"Five thousand francs for one song!" said an Empress; why a Marshal of France does not receive that for a months' service."

"Get a Marshal of France to *sing* for you then," said Patti.

The disposition to value every service from a basis of *manual* labor is universal, and not until the *tertiary* period is reached will the dear people recognize the fact that the difference between the p's, is dearly bought *experience*, that this intangible "commodity" has a definite value, and must be paid for or it will *not be produced.* The incompetency of pharmacists may be fairly laid to the charge of those who object to allowing a fair compen-

sation for the time, labor and money expended in *producing* competency. When the average citizen awakes to the fact that skilled labor in pharmacy differs in no respect from that in other professions, or if you like, *trades*, and the general standard of education has attained a point when that average citizen will feel that his *interest* is best subserved through the employment of the skillful and experienced in all branches, then will our tertiary period be reached, and it will be Pharmacy with a big P.

CINCINNATI, August, 1884.

THIRTY-SECOND MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

This meeting was held in the city of Milwaukee in the hall of the West Side Turnverein, and was called to order by President W. S. Thompson of Washington, D. C., on Tuesday August 26, at 3.15 P. M., when Hon. Mr. Walber, Mayor of Milwaukee, addressed the Association in words of welcome and commendation of its aims.

The annual address of President Thompson referred to the gradual elimination of the druggists' stock of many articles which in the infancy of our country were supplied from the drug store, but by the strong current of lower prices have been gradually drawn into other channels of trade. Similar causes now influence a particular class of medicines—proprietary, but nevertheless medicines—the sale of which forms a large item of the business of many druggists. Without considering the temporary expedients suggested, President Thompson sees the ultimate solution of the problem either (1) in the pharmacist maintaining his present position as purveyor of medicines by furnishing this class as cheaply as may be done by others; or (2), in abandoning their sale to those who may be willing to supply them at lower rates, and in confining himself exclusively to the technical affairs of pharmacy. The latter course would lead pharmacy to that elevated plane where it should be firmly placed. But the chief evil of the situation is the superabundance of drug stores. On the other hand it is evident that pharmacy throughout the country is continually progressing towards more elevated standards. The President then made various suggestions in regard to the internal affairs of the Association, and to the use of the special funds the interests of which are at its disposal. Referring to the history of the organization, and to the clause of its constitution which declares one of the principal aims to be "to improve and regulate the drug market by preventing the importation of inferior, adulterated and deteriorated drugs and by detecting home adulterations;" the President made suggestions looking towards a more systematic course for disseminating information as to the quality of commercial drugs and for exposing fraudulent adulterations with the view of preventing them.

The suggestions of the President were referred for consideration and report to a committee consisting of Messrs. W. J. M. Gordon, H. B. Parsons and Alonzo Robbins.

All members of the medical and pharmaceutical professions present in Milwaukee were invited to attend the sessions. The exhibition room being directly above the meeting room the deliberations were interfered with by the walking of the visitors; the exhibition room was therefore ordered to be closed during the subsequent sessions.

The report on credentials showed that delegates were present from nine Colleges of Pharmacy, five Alumni Associations, twenty-three State and ten county or city Pharmaceutical Associations. One member of each of these delegations was appointed to serve on the Nominating Committee and a member from each of two other Associations, who had failed to send credentials, was added by special vote. From the Association at large Messrs. A. Nattans, of Washington, D. C., F. W. Sennewald, St. Louis, J. C. Huber, Fond du Lac, Wis., W. P. Plummer, Bradford, Ill., and J. Jesson, Muskegan, Mich., were appointed as additional members.

The Committee on Exhibits was constituted as follows: W. McIntyre, Philadelphia, W. H. Bergman, Washington, D. C., J. Ingalls, Macon, Ga., Geo. H. Schafer, Fort Madison, Ind., and N. A. Kuhn, Omaha, Neb.

The names of sixteen candidates for membership were announced and the minutes of the Council meetings held since last year were read and approved. The report of the Publishing Committee stated the total cost of publishing and distributing the Proceedings of the past year to be $2,924.75. The report of the Committee on Membership announced the decease of twelve members and one honorary member since the last meeting. The Committee on Legislation reported that during the past year pharmacy laws had been enacted for the State of Ohio, for Erie county, N. Y., and for the State of New York, excepting New York city and the counties of Kings and Erie in which somewhat similar laws are already in force, so that in the State of New York four pharmacy laws are in existence which differ from one another in several important details. The report also showed that a national pharmacy law could not be enacted under the Constitution of the United States, except so far as the government service was concerned. A bill giving a commission and the rank of second lieutenant to the apothecaries of the army and navy has never been before Congress, and the report suggested the appointment of a special committee for this purpose.

The reports of other committees not being present, the Association adjourned until the next morning.

Second Session, Tuesday Morning, August 27.

After the reading and approval of the minutes the following officers were elected for the ensuing year: President, John Ingalls, Macon, Ga.; Vice-Presidents, John A. Dadd, Milwaukee, Henry Canning, Boston, and C. F. Goodman, Omaha, Neb.; Treasurer, Charles A. Tufts, Dover, N. H.; Permanent Secretary, J. M. Maisch, Philadelphia; Reporter on the Progress of Pharmacy, C. L. Diehl, Louisville; Committee on the Drug Market, M. N. Kline, Philadelphia, Chairman; W. A. Gellately, New York, E. W. Cutler, Boston, D. Myers, Cleveland, Ohio, W. Simpson, Raleigh, N. C.; Committee on Papers and Queries, J. U. Loyd, Cincinnati, Chairman, G. W.

Sloan, Indianapolis, W. W. Bartlet, Boston; Committee on Prize Essays, C. L. Diehl, Louisville, Chairman; H. B. Parsons, New York, Emil Scheffer, Louisville; Committee on Legislation, J. M. Maisch, Philadelphia, Chairman, S. A. D. Sheppard, Boston, E. Bocking, Wheeling; Members of Council for three years, W. J. M. Gordon, Cincinnati, J. L. Lemberger, Lebanon, Pa., W. S. Thompson, Washington, D. C.

The minutes of the Council meeting were read and approved, and eleven candidates for membership were proposed.

Prof. Diehl read the introductory portion of the report on the progress of pharmacy. Mr. P. C. Candidus, Mobile, was appointed a member of the Committee on Exhibits in place of Mr. Ingalls. It was stated that certain articles had been placed on exhibition which should have been excluded under the by-laws, or about which it was doubtful whether they could be admitted. The Committee was requested to enforce the rules and report doubtful cases to the Association. Local Secretaries were instructed, hereafter to embody into their circulars to exhibitors, Sections 1 and 2 of Art. V.

Mr. Ebert read the report of the Committee on the proposed meeting in California, discussion on which consumed considerable time. The report together with an invitation received from New Orleans was referred to a Committee on the time and place of the next annual meeting, consisting of Messrs. E. H. Sargent of Chicago, J. P. Remington, of Philadelphia, and P. C. Candidus of Mobile.

The Committee on Prize Essays reported that none of the papers presented last year appeared to be entitled to the Ebert prize. Mr. Robinson presented a resolution favoring the repeal of the tax on alcohol, which was referred to the Committee on the President's address.

The report of the Committee on Entertainments was read and referred to a Committee, consisting of Messrs E. H. Sargent, Chas. Eberle, and G. W. Sloan, for consideration and report.

The Committee on unofficinal formulas read a report, presented a number of formulas and made several suggestions; the whole subject was again referred to a special Committee consisting of Messrs. Chas. Rice, P. W. Bedford, W. P. DeForest, S. J. Bendiner and A. Tsheppe.

The Association then paid a visit to the exhibition room and adjourned until Thursday morning.

Third Session, Thursday Morning, August 28.

The Association met at 10 o'clock. The minutes of the previous meeting and of the Council meeting were read and approved. The Committee on Papers and Queries made a report favoring a change in the method for obtaining papers in answer to queries, the latter to be communicated to all the members, and subsequently printed in the Proceedings, the names of those who accept one or more thereof to be retained by the Committee.

The Committee on time and place of the next meeting reported in favor of meeting in New Orleans, on Monday, April 9, 1885, and did not consider it desirable at this time to recommend meeting in California. Much discussion was had on this report, Montreal, Newport, R. I. and Pittsburg being mentioned as desirable places for meeting, and the Association fin-

ally decided to meet in Pittsburgh on the second Tuesday of September, 1885.

A resolution was again adopted ordering the exhibition room to be closed, and a resolution was offered by Mr. Sloan, aiming at devoting nearly all the time of the sessions to the reading and discussing of papers, and, in accordance with the by-laws, referring all business matters to the Council, upon whose report they are to be decided, or at an hour specially assigned by the Association. This resolution was referred to the Council to report a by-law defining the manner in which business may be brought forward. Eight candidates for membership were proposed.

The first paper was now read by Mr. W. W. Bartlet, *On Opium Assays.* The processes experimented with were those of the Pharmacopœias of the United States, Germany, and Great Britain. Three samples of powdered opium were assayed and yielded respectively of morphine:

1.	12·50 per cent., U. S.	8·50 per cent., Ger.	5·12 per cent., Brit.
2.	12·48 " "	10·50 " "	8·25 " "
3.	13·40 " "	9·25 " "	3·42 " "

The conclusion arrived at by the author is that the present U. S. Pharmacopœia process is by far the most definite as to details, yields by far the most morphine, and hence exhausts the opium more thoroughly than the other processes. In the discussion which followed, Prof. Good said that instead of powdering commercial sal ammoniac as suggested by Mr. Bartlet, the salt may preferably be granulated from a hot solution. Regarding the morphine strength of opium it was stated that the British Pharmacopœia required at least six per cent. from crude opium, while the twelve and ten per cent. required by the United States and German Pharmacopœias refer to powdered and dry opium.

Professor Power next read a paper, on "Hydrastine," in which its history and process of preparation are described. Prof. Power finds the alkaloid insoluble in water and petroleum benzin, but soluble in dilute acids, in 1·75 parts of chloroform, 15·7 parts of benzol, 83·46 parts of ether, and in 120·27 parts of alcohol at 15° C. The alkaloid in solution is left rotating, and its most characteristic test appears to be sulphuric acid and ammonium molybdate, with which it produces an olive green color. Ultimate analysis gave results agreeing with Mahla's results, $C_{22}H_{23}NO_6$. The alkaloid crystallizes in four-sided prisms, which probably belong to the ortho-rhombic system. The sulphate of hydrastine contains 11 per cent. H_2SO_4, and the gold double salt 16·78 per cent of gold. Salts with organic acids could not be obtained; a commercial soluble citrate of hydrastine was an amorphous yellowish powder, and contained 1 mol. of alkaloid to 15 mol. (or 8 parts) of citric acid. Hydrohydrastine and ethylhydrastine were likewise prepared; but xanthopuccine could not be procured. In regard to the latter alkaloid, Prof. Maisch said that he had seen Mr. Lerchen's results in 1878, and while in its behavior it resembled berberine to some extent, yet in some reactions it was quite distinct, and it was free from hydrastine. Attention was directed by Mr. Ebert to various salts of berberine which certain manufacturers persist in calling hydrastine, causing confusion since the latter

alkaloid has likewise been used in medicine. Prof. Lloyd stated that hydrastine had been an article of commerce only for about five years, and it became necessary to designate it as "the white alkaloid." It is used in diseases of the mucous membrane and of the eyes, while berberine is a tonic and antiperiodic. Prof. Lloyd also said that he had not succeeded in obtaining crystallizable hydrastine salts. The dark green color which Mr. Hallberg said berberine shows with iron salts, according to Prof. Power, does not appear with pure berberine. Regarding pharmaceutical preparations, Prof. Power stated that with the aid of nitric acid, hydrastine could be combined with bismuth in solution. Mr. Kennedy said that 1 or 2 grains of the alkaloid hydrastine, with the aid of 4 grains of ammonio-citrate of bismuth, would dissolve in an ounce of glycerin and 1 or two ounces of water; and Dr. Menninger and Prof. Good stated that the application of hydrastis to mucous membranes was increasing, the fluid extract being prescribed properly diluted.

Mr. J. W. Colcord read a paper on *Canutillo*, which is recommended by Dr. S. Gleeson, of San Antonio, Texas, as a valuable remedy in syphilitic complaints. The fluid extract is dark red brown, and has a sweetish aromatic and astringent taste. The leafless branches, unaccompanied by flowers, were examined at Harvard University, Cambridge, and pronounced to be derived from an Ephedra, probably E. trifurcata, which is now common on the Southern borders; all our species of Ephedra are popular local remedies in syphilitic complaints. Dr. Menninger suggested that the effects were probably due to tannin. The paper elicited some discussion on the introduction of new remedies in general, many of which owe their virtues wholly or partly to tannin, and it was urged that such investigations should be made as early as possible; the search for remedies used by the Indians was mentioned, and the value of many plants was pointed out as remedies suitable for certain localities, and often preferable to such obtained from a distance.

A paper by Mr. S. G. Ade treated of the *fungoid growth in diluted phosphoric acid*, which is sometimes observed, and is by the author believed to cause the deterioration of the solvent power of the acid. A microscopical drawing of this fungoid, or more properly algaceous growth, was furnished. The author not being present, inquiries on several points suggested by his paper could not be answered. Prof. Remington had frequently noticed these confervæ, not only in dilute phosphoric acid but also in dilute acetic and other acids, and even in distilled water; they do not appear in the strong phosphoric acid at present officinal, which, therefore, serves well for making the dilute acid in small quantities; the same or a similar growth appears to be more injurious to alkaloidal solutions. Mr. L. E. Sayre mentioned a similar formation in a *solution of eserine*, in regard to which he had been informed by Dr. Formad that the alga did not feed upon this alkaloid so much as it did upon other substances present. Prof. Oldberg had seen the plant grow in diluted acid prepared from the concentrated phosphoric acid, while in officinal diluted phosphoric acid it did not make its appearance. Prof. Maisch suggested that the presence of alkalies favors the growth, and that a deterioration of the acid could take place only through

a combination with it of alkali, obtained from the glass, or of ammonia, generated by or contained in the plant, but that the phosphoric acid could not disappear. Mr. Ebert had noticed a similar growth in a *solution of citrate of iron and quinine*, which produced griping and diarrhœa, while a similar solution prepared directly from the salt was free from this objection. Mr. R. J. Brown stated that also solutions of *citric acid and of strychnine* were liable to produce the same growth, and suggested that all such solutions kept on hand be frequently examined; and Prof. Oldberg suggested that solutions found in such conditions are unfit for use.

An adjournment was then had until 4 o'clock P.M.

FOURTH SESSION, Thursday Afternoon, August 28.

The first business done at this session was the reading of the report of the Committee on the President's address; the propositions involving certain changes of the by-laws, the consideration of the report was laid over until the fifth session. A report was also read on the proposition to abolish the tax on alcohol; the Committee favor the abrogation of the tax upon such spirits only which are used for medicinal or mechanical purposes. This view was also adopted by the meeting, and the subject was referred to the Committee on Legislation.

A Set of Standard Dimensions for Simple Percolators was the title of a paper read by Professor Oldberg. Starting with pointing out the objectionable features of the ready made percolators at present obtainable, the conclusions arrived at by the prominent investigators of percolation are next summarized and may be briefly stated as follows:

1. Simple percolation is best suited for the pharmacist operating on a small or moderate scale, while repercolation can be profitably carried only on a comparatively large manufacturing scale.

2. Properly constructed simple percolators are preferable in point of economy and efficiency to the various patented contrivances.

3. Tall and narrow percolators best insure the proper exhaustion of the powder by means of simple percolation.

4. Percolators should be packed nearly full, and, therefore,

5. The quantity of the drug should be made to suit the percolator.

This necessitates a sufficient variety of sizes of percolators, to be adapted for the quantities of tinctures, fluid extracts, etc., usually prepared by the pharmacist.

On these principles the author has constructed a set of percolators, the dimensions of which have been adopted by the Chicago College of Pharmacy, and which will be made of glass, by Messrs. Whitall, Tatum & Co. of Philadelphia. The dimensions are:

Numbers.	Approximate capacity.		Length of body.		Internal diameter at the top.		Internal diam'ter of body at the shoulder.		Depth of shoulder.		Length of rubber tube.	
	Cc.	U. S. fluid measure.	Millimeters.	Inches.	Millimeters.	Inches.	Millimeters.	Inches.	Millimeters.	Inches.	Millimeters.	Inches.
1	90	3 fl. oz.	150	5·09	30	1·181	25	·984	4	·157	200	7·87
2	150	5 "	180	7·09	36	1·417	30	1·181	6	·236	240	9·45
3	240	8 "	210	8·27	42	1·654	35	1·378	8	·315	280	11·02
4	360	12 "	240	9·45	48	1·890	40	1·575	10	·394	326	12·60
5	530	18 "	270	10·63	54	2·126	45	1·772	12	·472	360	14·17
6	740	25 "	300	11·81	60	2·362	50	1·968	14	·551	400	15·75
7	1,240	42 "	360	14·17	72	2·835	60	2·362	16	·630	480	18 89
8	1,960	66 "	420	16·53	84	3·307	70	2·756	18	·709	560	22·05
9	3,000	100 "	480	18·89	96	3·780	80	3·150	20	·787	640	25·20
10	3,780	8 pts.	540	21·25	108	4·252	90	3·543	22	·866	720	28·35
11	5,700	12 "	600	23·62	120	4·724	100	3·937	24	·945	800	31·50
12	7,600	16 "	660	25·98	132	5·197	110	4·331	26	1·024	880	34·65
13	9,850	21 "	720	28·35	144	5·670	120	4·724	28	1·102	960	37·80
14	12,500	26 "	780	30·71	156	6·142	130	5·118	30	1·181	1,040	40·95

The total depth of each percolator is equal to five times its large, and to six times its small diameter. The exit tube of Nos. 1 to 4 is 30 Mm. (1·181 inch) long, 10 Mm. (·394 inch) internal diameter at the throat and 12 Mm. (·472 inch) diameter at the mouth; the corresponding dimensions for Nos. 5 to 14 are 35 Mm. (1·378 inch) 13 Mm. (·512 inch) and 15 Mm. (·591 inch). The mouth is closed with a perforated rubber stopper containing a glass tube of 3 Mm. ($\frac{1}{8}$ inch) internal diameter, to this is attached the rubber tube having 5 Mm ($\frac{1}{5}$ inch) internal diameter, and at the farther end another glass tube. The rubber tube may be lowered or raised to regulate the flow of the percolate.

Prof. Remington said that old-fashioned percolators could still be used for such preparations requiring a comparatively large amount of menstruum, as for most tinctures. As to large glass percolators, they are apt to break in consequence of the difficulty of annealing; Prof. Lloyd had similar experience, but Mr. Hallberg said that he had a number of glass percolators thirty-six inches high in use for three years, and had not lost one since he adopted the precaution of surrounding them with broad and thick bands of India rubber before putting them into the supports. Mr. L. E. Sayre suggested that maceration in glass percolators be conducted, not by closing the lower orifice, but by covering the well ground top with a tightly fitting plate, so that the air could pass out below as the menstruum descended.

The next paper read was by Prof. Virgil Coblentz on *Commercial Bromide of Potassium.* The author had examined two samples each, purchased at different times of the salt prepared by six American, one English and one German manufacturer. Five of these samples are described as being neutral, while the remainder had a more or less alkaline reaction, and caused a cloudiness with lime water. By volumetric estimation the alkali was found to vary between ·01 and 3·10 per cent. of carbonate. The solubility of one part of the salt in boiling water is given as varying between ·907 and 1·11 parts of the latter; and in alcohol at 15° C. between 114·2 and 199·5 parts. Traces of bromide were found in five samples, iodide in one sample, chloride in all samples, one being determined as 8·6 per cent., and sulphate in four samples. One sample contained a trace of nitrate, ten samples indicated the presence of traces of sodium and the moisture varied between ·2 and 1·5 per cent., while the weight of silver precipitate obtained from 1 Gm. of the salt varied between 1·48 and 1·990 Gm. (1·579 Gm. U. S. P.)

Mr. Macmahan made some remarks about the last meeting of the National Wholesale Druggists' Association, and another Committee, of which Dr. Enno Sander, of St. Louis, is Chairman, was appointed to attend the next meeting. Three candidates were proposed for membership.

Mr. C. S. Hallberg read a paper entitled *Simultaneous Fractional Percolation, with Notes on some Fluid Extracts.* The proposed process resembles re-percolation, but each of the four portions of the powder is in the beginning moistened with menstruum. One portion is then exhausted and the first percolate, equal to 20 per cent. of this portion, or 5 per cent. of the whole weight of the drug is reserved, the remaining percolate being used for the exhaustion of the second portion, from the percolate of which the same quantity as before is reserved. The third portion is treated precisely as the others, and from the fourth portion a total of 85 per cent. of the entire percolate is obtained, which being four times the weight of this portion of the drug, is amply sufficient for complete exhaustion. In the case of very bulky drugs, the percolate reserved from the first three portions is 10 per cent. each of the total amount to be obtained, so that the fourth portion yields 70 per cent. of percolate, or 3½ times the weight of the last portion of the drug.

The next paper read was a paper by Dr. H. T. Cummings, entitled *A Study of Percolation.* It was a criticism of a paper bearing the same title, which had been read by Mr. Rosenwasser at the meeting of 1882. The paper was referred to the publishing Committee.

The Treasurer's annual report which was now read showed the total income of the general fund during the past year to have been $10,518.95, and the disbursements $4,258.38, leaving a balance of $6,260.57 in the hands of the Treasurer. Acting on the suggestion of the Treasurer, the Association ordered that $316, which amount had been donated by various members in past years, be withdrawn from the general fund and added to the life membership fund.

The motion that $500 be placed at the disposal of Council for the purpose of making examinations of drugs and chemicals in the manner suggested

by President Thompson, was referred to the Council to report thereon next year.

A motion coming from the Committee on Legislation, that a special Committee of three be appointed to present to Congress a bill granting a Commission to apothecaries of the army and navy, was passed.

A resolution had been sent by Prof. Prescott. It provides for appointing a special Committee of three to report upon the most feasible and suitable legislation to secure a sufficient statement of the composition of proprietary medicines to be put upon each package of the same, and upon the most favorable and efficient action in regard to this matter. Prof. Prescott and Drs. Rice and Hoffmann were appointed the Committee.

The report of the Committee on the suggestions by the Entertainment Committee was read. It created considerable discussion and was finally recommitted to be disposed of at the next session.

FIFTH SESSION, Friday Morning, August 29.

After the reading and approval of the minutes of the preceding sessions and of the Council meeting, the last mentioned report somewhat modified, was again read, and was then adopted, and Mr. H. W. Atwood, of New York, was elected Chairman of the Entertainment Committee for the ensuing year.

The reading of papers was then resumed, the first one presented being by Mr. G. W. Kennedy, *on Cream of Tartar as sold by pharmacists and by grocers.* Of 14 samples obtained from pharmaceutical stores in 13 different cities, only one sample was found adulterated, while the remaining 13 contained no impurity except calcium tartrate, which, however, reached 12 per cent. in one of the samples. Corresponding with these in purity were 6 out of the 13 samples purchased at grocery stores, the remainder being adulterated with chalk, alum, clay or starch.

Amendments to the by-laws coming up under the recommendations of President Thompson were agreed to; thereby the salary of the Permanent Secretary was increased to $750, and the requirement to return the certificate of membership by members relinquishing their connection with the Association was abolished. Notice of an amendment was given that the Treasurer's salary be increased to $600.

A paper written by Mr. H. B. Parsons *on the Water of Hydration in Commercial Sulphate of Quinine* showed that it amounted in

1.	16 samples	of an	American	brand	to	13·72	per cent. average.
2.	184	"	"	"	"	12·61	" "
3.	12	"	"	a German	"	12·32	" "
4.	634	"	"	"	"	14·09	" "
5.	169	"	"	an Italian	"	14·36	" "
	10·15	"	examined,			13·84	

The first and third lots varied most; No. 2 approximated very closely to $6H_2O = 12{\cdot}53$ per cent., while Nos. 4 and 5 uniformly contained about $7H_2O = 14{\cdot}45$ per cent.; not a single sample contained over 15 per cent.

The author takes occasion to repeat a suggestion which has been repeatedly made, that the stable sulphate containing $2H_2O = 4.6$ per cent. be made officinal in the future.

Mr. Henry Biroth exhibited *a new poison case*, constructed by him, and read a description of it. The case is divided into 10 compartments, two of which are labeled morphine and five others respectively opium, cyanides, corrosive sublimate, arsenic and strychnine. These compartments contain the various preparations designated, bottles of different size, shape or color being used. The three remaining compartments are intended to contain the strongest acids and poisonous tinctures, alkaloids and glucosides.

Considerable discussion was had on this paper, nearly all of the speakers agreeing that poisonous articles should be isolated, but as to their proper arrangement much diversity of opinion was presented, some preferring a systematic arrangement, while others favor the opposite course, as requiring additional care and inducing the habit of consulting the label. The enclosing of tincture bottles in tin cans was also recommended, as an additional safeguard, and on the other hand it was contended that an additional source of danger was thereby created, arising from the misplacing of the outside boxes or cans. The possibility of mistakes occurring, not through ignorance but from overwork, was likewise illustrated.

Mr. Biroth exhibited a specimen of an article which thirty years ago was sold under the name of *Pepsau*, and was prepared near Jamestown, Chatauqua county, N. Y., by a man known as "Crazy Owen." The circular accompanying the bottle reads as follows:

"PEPSAU.—For the cure of Dyspepsau, Jaundice, Liver Complaint, together with all diseases arising from a disorganization of the Stomach. This, I believe, is the Gastric Juices of the Stomach of the Ox, producing the Gastric Juice required by man to digest his food. Prepared by Eben Owen; by no other, I believe, in this world.

"*Directions for Using.*—Take a small half teaspoonful, fifteen minutes before eating, in a half gill of cold water. My advice is, to eat light suppers.

"Prices for Pepsau, by the gross or more, eighty cents per bottle; retail, one dollar a bottle. This is got up under prayer, and will do good, I believe.

"April 16, 1853. EBEN OWEN."

A paper by Mr. Edward Goebel, on *Cinchona Assay* was read, in which slight modifications of the U. S. Pharmacopœia process were suggested. Using 15 Gm. of the powdered bark, it is treated with lime as directed in the officinal process, and, after digesting with 150 Ccm. of alcohol, 100 Ccm. of the tincture, representing 10 Gm. of the bark, are filtered off. Instead of finally drying the precipitated alkaloid in a capsule, it may be dried with care and weighed in a tared filter.

Prof. Lloyd read a paper entitled *Precipitates in Fluid Extracts*, which is printed in full on p. 449 of our last number. In the present number, on page 508, we publish, in a very condensed form, the results of some older investigations on the subject of capillarity. Mr. Vogeler stated that the separation of water from saline solutions by means of absorbent material had been known for a long time.

A paper by Mr. Henry Maclagan on *Mercurous Iodide* reported proofs that this salt when pure is yellow, and that when of a green color this is due to the presence of uncombined metallic mercury, the green tint being deeper in proportion as the amount of the latter increased.

In a paper sent by Prof. O. A. Wall, the question was discussed: To what extent, if at all, is it proper for the physicians to specify in their prescriptions the *particular make of preparations* prescribed by them? The author's views are summarized thus: The physician should specify to the extent he may *know*, that proper remedies are dispensed, either by directing the patient to go to a certain drug store or by specifying a particular preparation with which he is familiar and in which he has confidence. Mr. Hallberg did not agree with this conclusion, but claimed for the pharmacist, who understands his business, the privilege of using his own judgment in supplying the physician's wants to the best of his ability.

Mr. Kline read a portion of the report of the Committee on Drug Market, and more particularly gave an interesting account of the condition of the market and the causes influencing the supply and price of cinchona bark and of quinine.

Rhubarb, its history, habitat, culture and preparation, with reference to its cultivation in the United States, was the title of a paper presented by Mr. J. W. Colcord. Regarding cultivation, the author says that "given the proper soil, I have no doubt but that rhubarb culture in this country can be made a success; whether it would prove remunerative from a financial standpoint, would require repeated and long-continued experiments; my impression is that it would."

A paper by Mr. C. W. Phillips, on *Compound Emulsion of Copaiba*, details the manipulation for obtaining a perfect emulsion containing copaiba ʒij, gum arabic ʒj, saccharated pepsin ℈j, and tinct. chloride of iron ʒij in a two-ounce mixture. An emulsion is first formed with the first three articles and about one-third of the water, the remaining water being used for diluting the tincture of iron, and this mixture is then added to the emulsion, the whole being well shaken.

Mr. H. Maclagan had sent a paper entitled *Modification of Kerner's Test*, the object being to obtain reliable results regardless of variations in temperature. The modification consists in keeping an excess of pure quinine sulphate under water, so as to have a saturated solution of it always at hand. The salt to be tested is then treated in a similar manner, and both solutions are then to be tested in the usual manner with ammonia water at the same temperature. In the same way a solution may also be made from pure quinine containing 1 or 2 per cent. of cinchonidine, so that the absolute or relative purity of the sample may be readily ascertained by comparison.

Dr. A. W. Miller had made inquiry into the alleged commercial supply of *artificial oil of gaultheria*, and came to the conclusion that the present high price of salicylic acid would prevent the substitution of the artificial for the natural oil, unless the price of the latter should advance to $3.00 or more, but that the firm controlling Kolbe's patent might possibly with advantage dispose in this manner of an excessive production of the acid.

The prevention of brittleness in plasters was discussed by Mr. H. W. C. Martin, who sought to imitate the softening action of glycerin by the use of castor oil. A plaster made of castor oil 1 part, olive oil 8 parts, oleic acid 2 parts and litharge 6 parts was hardly up to the requirements of the Pharmacopœia in regard to its solubility in oil of turpentine, but with the thermometer ranging between summer heat and below zero it remained firm, yet pliable, without being brittle or excessively sticky.

The reading of the papers came to a close with *Cleanliness in Pharmacy*, which was discussed by Mr. G. G. C. Simms.

A number of resolutions of thanks were passed; Mr. George A. Kelly was elected Local Secretary; a resolution was passed that in the Proceedings the discussions on pharmaceutical subjects alone should be published, and the Association finally adjourned to meet again in Pittsburgh on the second Tuesday of September, 1885.

We cannot make room for a detailed statement of the attentions paid to the visitors by the local pharmacists. There was no banquet, but everybody was pleased with the cuisine of the Plankinton; nor was there a grand concert or ball, but the lovers of good music had occasion to enjoy a rare treat from amateurs, and those fond of terpsichorean amusement were likewise gratified in the arcades of the Plankinton. A drive through different parts of Milwaukee, visits to various industrial establishments, prominent among which were the breweries for which the Cream City is famous, attendance at a comic opera in Schlitz's Park and a steamboat excursion on Lake Michigan entertained the visitors. That the inner man was not neglected and that many visitors were gratified by the hospitality extended by families, need merely be mentioned. After the adjournment numerous parties extended their trips to different lakes, to Waukesha, Tonyawathee on Lake Monona near Madison, where the capitol and University of Wisconsin are located, to the dells of Wisconsin, to St. Paul, Minneapolis and other places of interest.

THE BRITISH PHARMACEUTICAL CONFERENCE.

In August of the present year the British Pharmaceutical Conference has attained its majority, but it can hardly be said that the gathering at Hastings, under the presidency of Mr. John Williams, with which it completed its twenty-first year, was suggestive of an excess of virility. It is true that, as remarked by the President, the meeting took place under exceptional circumstances. For the second time in the history of the Conference it had decided not to follow the lead of the British Association in respect to the locality it would visit, and the occasion was also marked by the initiation of an experiment in the shape of a "self-denying ordinance." How far either or both of these conditions affected the result, we are not prepared to say; we merely chronicle the fact that notwithstanding the attractions of Hastings, and its easy accessibility to the metropolis, the attendance of members was unusually small. We are afraid, therefore, that if, as indicated in the Annual Report, the Executive Committee is disposed to regard the present meeting as a test of what would take place were the Conference

to cease to assemble annually in the same town as the British Association, a reform that we are inclined to think a desirable one will be indefinitely delayed.

The proceedings were commenced at half-past ten on Tuesday morning, August 12, in the Assembly Room of the Castle Hotel. Apart from the announcement that Mr. Benger and Mr. Ekin, the former after serving thirteen years as one of the Honorary General Secretaries and the latter after seven years as Treasurer, had expressed their intention not to accept again the respective offices, the principal feature in the annual report was the allusion to a vigorous effort that had been made to extend the membership in India and the colonies. We think that so far as this attempt may prove to be successful it will be a clear gain to the interests of pharmacy, and therefore to the Conference. But it must not be forgotten that an accession of members residing thousands of miles from the ordinary itinerary of the Conference, although it may swell the numbers, is not likely to furnish recruits to more than a nominal extent to the most characteristic portion of the operations of the Association, the partly scientific, partly social meetings, such as the one held on the south coast during the past week. The Treasurer's report showed that onee more the expenditure had exceeded the receipts. This, in reply to a question put by Mr. Bottle, was attributed to the expense of distributing copies of the address delivered by Professor Attfield last year, and to the cost of a special "whip" that had been made to secure new members at home and abroad. It is not quite apparent, however, from the accounts presented, how the whole of the deficit—about £150—can have been due to the causes mentioned, and had it not been for the statement made by one of the Honorary General Secretaries we should have inferred that there had really been an "outrunning of the constable" to some extent. However this may be, we believe that many of the members will be pleased to observe that that item is not likely to occur again in the accounts, and that the broadcast touting which had come to be looked upon as a periodical event is to be abandoned in favor of an appeal simply to such persons as may pass the examination qualifying as a chemist and druggist each year.

The Address of the President was not conceived in a very ambitious spirit, and the company who assembled to hear it was not so numerous as some other meetings on similar occasions in previous years; but the delivery of it was none the less a great success. The President was not decoyed by the example of his predecessor, on two separate occasions, into entering the field of pharmaceutical politics, which has always been held at meetings of the Conference to be tabooed ground when any one of less degree than the Chairman has proposed to enter it. The principal theme on the present occasion was a few points which seemed to have a bearing, more or less remote, upon those branches of science with which pharmacists, as a body, are particularly connected. Starting with a reference to the consequences following upon the discovery of the tinctorial properties of some derivatives from coal tar, obtained during an abortive attempt to build up quinine, the speaker illustrated the way in which succeeding investigators, whilst endeavoring to wrest similar secrets from Nature, have acquired knowledge concerning various natural compounds which pharmacists have to manipu-

late that has led to more or less successful attempts to build them up artificially. Then came the important question whether the artificially combined compounds produced the same medicinal effects in the human system when administered as those they were designed to represent, and therapeutists, no less than pharmacists, will note with interest that a man of such wide practical experience as Mr. Williams is not prepared at present to answer that question in the affirmative. From the vegetable principles to the plants in which they are formed was but a step, and in a few sentences it was made evident how what might appear to be most abstruse researches upon physiological botany may have a very important bearing upon the operations of practical pharmacy. In a like manner, the successful liquefaction of gases that had been looked upon as refractory was, after a parenthetic reference to the relatively narrow limits of temperature within which the life of organized beings is possible, made to have a business application that will probably be suggestive to many of the hearers. The new pharmacopœias, the justice of the claim of pharmacists to be officially represented on future committees charged with the compilation of such works in this country, and the compilation of an International Pharmacopœia were the topics to which the latter part of the Address was devoted, the treatment of each being such as commended itself to the approval of the audience, as we think it will also to most who make their first acquaintance witn the Address by reading it. We may add that although through a slight misunderstanding the comments at the conclusion of the Address were unusually few, Mr. Williams had ample reason to be gratified by the manner in which the Conference subsequently created an opportunity for expressing an opinion respecting it.

The reading of communications commenced as usual with reports from gentlemen who had undertaken the investigation of various subjects, partly at the expense of the Conference. We shall simply refer here to the most salient features in them. The first two papers were from Mr. W. Elborne, and were upon the subject of English Rhubarbs. It would appear that English-grown "rhubarb" from *Rheum officinale*, the plant which was first brought to Europe about sixteen years ago (*Pharm. Journ.* [3], iii., 301), has now taken its place side by side in commerce with that from *R. rhaponticum*, from which it may be distinguished upon fracture by the comparatively black color of the veins imbedded in a white parenchymatous tissue. The excessive development of this tissue, observed in the earlier experimental samples of this variety by Mr. Holmes (*Pharm. Journ.* [3], vii., 301), was no doubt due to "high cultivation," and it has been found that with a slower growth the roots become more dense, and when prepared are of a richer and darker color. One of the reports was devoted to some historical, botanical, and microscopical notes on English-grown rhubarb, and the method of its preparation, and the other gave the results of a series of analysis showing to a certain extent the constituents of samples of English "officinale" and "rhaponticum," East Indian and the old-fashioned Russian rhubarbs. It was mentioned that the production of English rhubarb now amounts to twelve thousand pounds weight yearly.

Mr. A. W. Gerrard presented a final report upon the alkaloidal value of

wild and cultivated belladonna plant. Summing up the results of his researches, he stated that they had shown that wild belladonna generally contains more alkaloid than the cultivated, though not to an important degree, but that the cultivated plant is the better suited for the manufacture of pharmaceutical preparations on account of its greater uniformity. He had found the leaf to be the part of the plant richest in alkaloid, the root, fruit, and stem being next in order. He therefore suggested that preparations of belladonna leaf should supersede those of the root, except in the case of the liniment, and he also advocated the introduction of a formula for an alcoholic extract into the British Pharmacopœia. With regard to the time of collection, Mr. Gerrard is of opinion that the growth of the leaf does not affect the proportion of alkaloid in the root and that the two parts may, therefore, be collected without disadvantage at the same time. Closely connected with the same subject was the report of Messrs. Dunstan and Short upon the "Estimation of the Alkaloids in *Atropa Belladonna*." This was a summary of a paper recently read before the Pharmaceutical Society, describing a process in which the root is exhausted by hot percolation with a mixture of chloroform and absolute alcohol, the alkaloids extracted from the percolate by shaking it with water and then withdrawn from the aqueous solution by agitation with chloroform after the addition of ammonia. Next Mr. Hasselby recounted the steps in an attempt to carry out in the garden attached to his house in Hastings a suggestion made by the President of the Conference last year that pharmacists should as far as possible grow their own supply of vegetable drugs. His experiments had been made upon belladonna and henbane, the former yielding tolerably good results, whilst the latter had not given so much satisfaction. The discussion that followed the reading of these three papers turned principally upon the subject of cultivation and the effect of it upon the active principles contained in plants; but Mr. Gerrard also mentioned some experiences met with in the cultivation of henbane that have led him to suspect either the existence of three varieties or of a hybrid between the two at present recognized. The suggestion as to the substitution of leaves for the root of belladonna in making pharmaceutical preparations did not appear to be regarded with favor by Professor Redwood, who thinks the leaves are much more liable to undergo deterioration than the root.

On resuming after luncheon, the first paper read was a "Report upon an Investigation on the Chemistry, Botany and Pharmacy of the Strychnos Nux-Vomica," by Messrs. Dunstan and Short. This was a *résumé* of work done with the financial assistance of the Conference, which has formed the subject of a series of papers that have already appeared in this Journal. The principal points have been the devising of what the authors claim to be a simple and accurate process for estimation of the alkaloids of nux vomica seeds, in which a mixture of chloroform and alcohol is used for their exhaustion; the application of the process in the examination as to their alkaloidal value of nux vomica seeds from various sources, with the result that of the kinds entering the British market, the Bombay was found to be the richest, followed by Cochin and Madras, whilst all the varieties contained more alkaloid than had been previously supposed; a method for separating

brucine and strychnine, based upon the different solubility of their ferrocyanides; the examination as to alkaloidal strength of galenical preparations of nux vomica, leading to suggestions for the standardizing of the tincture and extract which no doubt were the provoking cause for two other papers read at the Conference; the discovery of a new glucoside, which has been named "loganin," in the pulp of the fruit and the seeds; and the examination of some nux vomica seeds from Ceylon that proved to be unusually rich in alkaloid.

In some "Notes on the Estimation of Hydrocyanic Acid and Cyanides," Mr. L. Siebold reverted to the subject of a communication read by him last year,—the error to which Liebig's process for the volumetric estimation of hydrocyanic acid is liable if the titration be effected in presence of a deficiency of alkali and the failure of litmus to indicate the point of neutralization. After alluding to weak points in several suggestions that have been made for overcoming this defect, he recommended the use of a standard solution of soda and the performance of a preliminary titration. He also mentioned that in working upon the United States official process, in which an excess of calcined magnesia is used instead of soda, he had found that with certain precautions the carbonates of the alkaline earths might be used, and that, in the presence and by the interventions of silver nitrate, hydrocyanic acid is capable of decomposing such minerals as chalk, calc spar and magnesite.

The next paper, "Further Notes on the Pharmacy of Linseed," by Mr. T Greenish, gave rise to the most animated discussion of the day. Mr. Greenish is of opinion that serious objections apply to the use of linseed cake as a source of the official farina lini, one of them being that it is a bye-product and not specially made for the purpose. He would prefer, in its place, linseed rich in farina and as free as possible from weed seed, crushed lightly between iron rollers without expressing any oil, and with about 20 per cent. of the husk removed to make it approximate more closely to a meal. Mr. Greenish stated that when the seed is thus crushed lightly, the oil is hardly disturbed in its natural cells and does not become diffused throughout the meal so as to be exposed over a large surface to atmospheric influences. He also explained the part played by the husk in yielding in contact with water a supply of vegetable mucilage, and said that though the retention of 80 per cent. was equal to the necessities of forming a good plastic poultice, the removal of too large a quantity would leave the farina incapable of doing so. Professor Redwood, whilst admitting the value of the paper, said that when, years ago, crushed linseed came into use it did not answer expectations and was found to turn mouldy when kept in closed vessels. Moreover, he was disposed to believe that under the present system of examination of linseed by the Linseed Association, it must necessarily be very pure and free from admixture of foreign seeds. There seemed to be diversity of opinion as to the explanation of the existing preference for crushed linseed, some speakers attributing it to an actual superiority, and others thinking that it is due to some medical practitioners specially instructing their patients to use it.

The first day's proceedings were brought to a close by the reading of two

papers upon the subject of "Standardizing," one by Mr. G. F. Schacht and the other by Mr. D. B. Dott. That Mr. Schacht does not look with favor upon the proposal to standardize all powerful pharmaceutical preparations is pretty well known. In the present paper he argues that such preparations are devisible into two classes, one consisting of those that are dilutions of definite chemical substances, and so allow of being standardized, and the other of preparations of more or less complex substances, concerning the mode of operation of which little is yet known. In the present empirical state of the practice of medicine, he maintained, it would be worse than useless to pretend to standardize such preparations in respect to their contents in active principle, and he said that even if the case were different it would be for pharmacy to assist in the inquiry, not to initiate or conduct it. Mr. Dott also considers that the attempt to standardize certain preparations would be misleading, and he would see in the alleged variations in their contents rather a reason for their disuse. But he believes that, in nearly every case, if the material operated upon be of proper quality the preparations will be of the right strength. These papers, perhaps on account of the hour, did not give rise to so much discussion as might have been expected, but some disposition was evinced to concur with the writers. Professor Redwood, however, said he saw no reason why preparations of such drugs as opium, cinchona and other drugs containing known active principles should not be standardized as far as possible, leaving what was not yet understood alone.

The proceedings were recommenced on Wednesday by the reading of a note by Mr. Keyworth, entitled "A Fossil Aloe from the Wealden," in which the author had found scope for a flight of the scientific imagination and the executive committee an opportunity for showing the extent of its faith in believing the paper had a bearing on anything pharmaceutical. Mr. Naylor followed with more information respecting hymenodictyonine, the alkaloid from *Hymenodictyon excelsum*, which he has now coaxed to crystallize and represents by the formula $C_{23}H_{40}N_2$. It is inferred from the results of experiments that it is a tertiary dyamine closely analogous with nicotine, with which probably it is homologous.

Mr. Willmott's "Note on the Filtration of Lard" was a defence of the position taken by him, in a paper read at the last previous Conference, that the operation of filtering in the preparation of lard is not the most advantageous. His more recent experiments have led him to the conclusion that the operation of filtration is more honored in the breach than the observance, better results having been obtained by straining through flannel, which Professor Redwood is inclined to attribute to the fat not being exposed to atmospheric oxidation so long or over so large an extent of surface. Mr. Naylor said he preferred to melt the flare at a low temperature and filter it as rapidly as possible through paper. In the discussion Professor Redwood incidentally alluded to the vast number of communications that had been received by those engaged on the new Pharmacopœia, some of which recommended the entire exclusion of animal fats; but he said he could not agree with the proposition, as, in his opinion, there is no substance comparable, as a base for ointments, with good, well prepared,

sweet lard, freed at a low temperature as far as possible from extraneous organic matter.

"The Composition of Seidlitz Powders" formed the subject of a paper by Mr. Martindale, who said his attention had been drawn to the subject by the complaint of a customer as to the formation of a foam or scum on the top of the effervescence when some powders supplied by him were dissolved. Upon investigation he found this scum to be due to the formation of cream of tartar when the acid was in excess, and that it more readily occurred when the weather was cold. After referring to the varying receipts current for the preparation of seidlitz powders, he expressed an opinion that an authoritative formula ought to be inserted in the Pharmacopœia, to be followed when powders were supplied upon the prescription of medical men.

The next paper was on "The Pungent Principles of Plants," by Dr. Thresh, which might conveniently have been preceded by one by the same author, read subsequently, on "The Proximate Analysis of *Alpinia Officinarum*." In the latter paper Dr. Thresh described the manner in which he had isolated from galangal rhizome an active pungent principle, which he has named galangol. In the former he dealt with certain points of resemblance between this and other pungent principles, especially gingerol, from ginger, capsaicin, from capsicum, and paradol, from grains of paradise.

A note by Mr. Southall followed, on a specimen of a kind of a gigantic truffle used by the natives of Tasmania as food, which had been presented to the Conference by Mr. Miller. The fungus is referred by Mr. Southall to *Mylitta Australis*, of which he considers it to be the sclerotioid mycelium; it consists principally of pectic.

The last paper read at the Wednesday morning session was a note by Mr. Williams upon some products obtained during the preparation of some specimens of colorless and anhydrous essential oils. The oils were distilled from a fusible metal bath. After all the water, mixed with a little oil, had passed over, the anhydrous oils were collected up to a point when the temperature rose more rapidly and a colored fraction commenced to distil. The distillation was then continued into another receiver until just before decomposition would commence. The colorless anhydrous oil was, as a rule, very much modified in odor, and more delicate than the colored portion, whilst the odor of the residue was strong and sometimes offensive. Mr. Williams appears to think that by this treatment the colorless portions had not only had their aroma improved, but were probably rendered more permanent. Naturally the questions were raised in the discussion whether the foul-smelling portions might not have been products of the process and not educts, and to what extent the odorous constituents might be destroyed or removed with them. It may be worth recalling that an opinion has been expressed by Professor Dragendorff that the odor of an essential oil may be due to a constituent present in extremely minute quantity (*Ph. J.*, [3], vi, 723).

Upon the reassembling of the Conference there were still ten papers on the list unread, not one of the authors of which was present. The principal points in the papers were, therefore, read by the Honorary Secretaries,

Messrs. Benger and Plowman, and as the circumstances were not favorable to much discussion the proceedings were brought to a conclusion about the usual hour. The first was a note on "Tincture of Quinine," by Mr. T. Wright, which contained an account of many interesting experiments as to the causes of precipitates that form in it and the way of avoiding them; the outcome of which was the conclusion that a concentrated neutral tincture of quinine of uniform strength could be best obtained by using the hydrochlorate of the alkaloid instead of the sulphate. In connection with this subject Mr. Martindale expressed a hope that hydrobromate of quinine would be included in the next edition of the Pharmacopœia.

The next two papers were extremely technical. In one Mr. Hodgkin gave his reasons for supposing that "China bicolorata," or "Tecamez bark." is derived, like "cuprea bark," from a species of *Remijia*, which he is inclined to regard as a third species of the genus yielding cinchonine alkaloids and names *Remijia bicolorata*. In the other Mr. Hooper, the recently appointed quinologist to the Government plantations in Madras, gave the results of the analyses of some old cinchona barks, the most notable point in which, perhaps, is that he found in one of them 1·99 per cent. of quinidine, being more than had been previously observed in any bark.

Last year Mr. Maben and Mr. Conroy reported to the Conference on the possibility of using sesame oil for pharmaceutical purposes, and expressed opposite opinions as to its availability for the manufacture of lead plaster, the former gentleman stating that it was suitable if a larger proportion of lead oxide were used than is ordered officially. He has since repeated and extended his experiments, and sent with his note describing them some samples confirmatory of his opinions. He obtained very good results when the proportion of lead oxide was increased 40 or 50 per cent.

Another paper by Mr. Maben, in conjunction with Mr. Dechan, was a "Report on the Strength and Condition of Commercial specimens of Hydrargyrum cum Cretâ, Pilula Hydrargyri and Unguentum Hydrargyri." The statements contained in this communication will no donbt cause it to be studied with considerable interest and it provoked much comment among the members present at the Conference. Twelve specimens of grey powder were found to vary in the amount of unoxidized mercury they contained between 21·2 per cent. and 49·6 per cent.; mercurous oxide ranged between traces and 6·15 per cent.; and mercuric oxide between 0·65 per cent. and 4·67 per cent. Eight samples of blue pill were examined, six of which contained no trace of either oxide; they varied in percentage of mercury from 28·45 to 41·3 per cent. The samples of ung. hydrargyri also varied considerably, only one out of eight containing the B. P. proportion of mercury.

Mr. E. C. C. Stanford has been pursuing his investigations of various bodies reputed to contain iodine and has now added oysters and burnt sponge to the list of those examined. Persons who have hitherto pinned their faith to the special medical efficacy of Anglo-Portuguese oysters being due to the iodine they contain, may perhaps, upon learning that this quantity is only equal to four parts in ten millions, feel they may extend their masticatory operations to other varieties without risking much loss. Turkey sponge turns out to be about four times as rich in iodine as honeycomb sponge.

In a "Note on Sulphurated Lime," Mr. Dymond stated that some comparative experiments had shown that the best method of preparing it is to roast seven parts of finely powdered sulphate of calcium with one of charcoal until the black color has disappeared. In another note he described a method for the estimation of diastase in malt extract.

Mr. MacEwan communicated a "Report on Commercial Peruvian Balsam and the Methods for ascertaining its Purity." Twelve samples from different sources had been examined, and the author stated that so far as he is able to judge the present supply of the balsam is of good quality.

The last paper was a note by Mr. J. R. Hill on the "Presence of Copper in some Pharmaceutical Preparations," which seemed to indicate that the metal in question is frequently present where little suspected. The explanation is, no doubt, to be found in the use of copper vessels for pharmaceutical manipulations.

The concluding business was then proceeded with. Mr. Kay, in the name of the pharmacists of Aberdeen, gave a hearty invitation to the Conference to visit that city next year, and this, on the motion of Mr. Benger, seconded by Mr. Plowman, was accepted. The President then alluded to the loss the Conference was sustaining in the retirement of Mr. Benger and Mr. Ekin, and proposed a hearty vote of thanks to those gentlemen. This, after being supported by Mr. Schacht and Mr. Plowman, was carried by acclamation, and Mr. Benger acknowledged the compliment. The election of officers for the ensuing year then took place, with the following result.

President.—J. B. Stephenson, Edinburgh.

Vice-Presidents.—F. Baden Benger, F.C.S., Manchester; M. Carteighe, F.I.C., F.C.S., London; C. Ekin, F.C.S., London; J. P. Kay, Aberdeen.

Treasurer.—C. Umney, F.I.C., F.C.S., London.

General Secretaries.—S. Plowman, F.I.C., M.R.C.S., London; J. C. Thresh, D.Sc., F.C.S., Buxton.

Other Members of Executive Committee.—S. R. Atkins, Salisbury; J. A. Bell, Hastings; J. Borland, F.C.S., F.R.M.S., Kilmarnock; J. E. Brunker, M.A., Dublin; W. Hills, F.C.S., London; D. B. Dott, F.R.S.E., Edinburgh; W. A. H. Naylor, F.C.S., London; J. Sim, Aberdeen; W. H. Symons, F.C.S., F.R.M.S., London.

Local Secretary.—A. Strachan, Aberdeen.

Auditors.—H. J. Joseph, Hastings, and J. Paterson, Aberdeen.

Hearty votes of thanks were then given to the Local Committee, especially mentioning the names of Messrs. Bell, Rossiter, Keyworth, and Joseph, and a similar vote having been enthusiastically given to the President, the business proceedings of the Conference for 1884 terminated.

An hour afterwards a company of about sixty sat down to dinner, at which they were favored with the presence of the Mayor. After dinner the toasts were limited to "The Pharmaceutical Conference," "The Town of Hastings" and "The Local Committee." When these had been responded to, the rest of the evening was devoted to music and conversation.

Provided that the weather be fine an excursion is usually a most agreeable adjunct to the Conference meeting, and this year it was perfection. On Wednesday morning a party of about one hundred ladies snd gentlemen

left the Castle Hotel in four-horsed breaks and other vehicles which proceeded along the beautifully wooded road to Battle Abbey. Arrived there, a guide accompanied the party through the different parts of the Abbey and grounds, and his description of the Battle of Hastings was kindly supplemented and to some extent contradicted by a lucid statement from Mr. Thomas Horsham Cole, a local antiquary. Whilst the party was passing through the beautiful library the Duke of Cleveland entered and gave a most courteous welcome. From Battle the company proceeded to Ashburnham, where they were admitted to the rare privilege of seeing the famous artistic, literary and other treasures of that mansion, many of them specially associated with the Stewart kings, and of strolling through the beautiful gardens and grounds. Normanhurst was next visited, but before venturing upon the inspection of the wonderful collection of curiosities accumulated there by Sir Thomas Brassey and his lady, the company lunched together in the tennis court. After lingering about this beautiful spot till the last moment, a rapid drive brought the company back to Hastings, and within half an hour many of them were traveling as fast as steam would allow to all parts of the kingdom.

We cannot conclude our account of this meeting without testifying to the excellence of the arrangements, which reflected the highest credit upon the Local Committee and its energetic Secretary, Mr. Rossiter, as well as upon the General Secretaries of the Conference. Everything went well, with that absence of friction which marks the forethought and care without which the management is apt to come into greater relief. The only drawback to the meeting was the stunted dimensions which it assumed in respect to the personal attendance indispensable to the social phase of the Conference. Perhaps if the Executive will, during the coming year, turn a little of the attention which has been lately somewhat exclusively devoted to increasing the number of members to the multiplication of inducements to bring them together once a year an improvement may be attained in this direction also, *Phar. Jour. and Trans.*, Aug. 16, 1884, p. 123.

EDITORIAL DEPARTMENT.

POISONS IN MEDICINES.—The editorial on page 496 of our last number was written in the early part of August, and on account of the absence of the editor, was not modified after the inquest when under the instruction of Deputy Coroner Ashbridge his jury censured the dispenser Mr. C. W. Mengle who was held to answer the charge of involuntary manslaughter by the Coroner of this county, for causing the death of Ann Carroll, by negligence in omitting to place upon the box containing one hundred strychnine pills of 1-20 of a grain each the label "poison," in accordance with the terms of Act of Assembly of March 31st, 1860, Section 70. The law upon which Mr. Mengle was held is as follows:

"No apothecary, druggist or other person shall sell or dispose of, by retail, any morphia, strychnia, arsenic, prussic acid or corrosive sublimate, except upon the prescription of a physician, or on the personal applica-

tion of some respectable inhabitant of full age, of the town or place in which such sale shall be made, and in all cases of such sale the word poison shall be carefully and legibly marked or placed upon the label, package, bottle or other vessel or thing in which such poison is contained; and when sold or disposed of, otherwise than under the prescription of a physician, the apothecary, druggist or other person selling or disposing of the same shall note in a register, kept for the purpose, the name and residence of the person to whom such sale was made, the quantity sold, and the date of such sale."

We have been familiar with this law, and many years ago have conversed with some of our most reputed pharmacists upon the interpretation of the words "sell or dispose of by retail," and it has been held by all, that they were used with the view of excluding physicians' prescriptions for medicines. It was reserved for a Deputy Coroner to advance the theory that the latter were included. Fortunately, however, Judge Elcock on September 19th, rendered a decision, directly opposite to that theory, and fully in accord with common sense, with universal usage, with the hitherto unquestioned interpretation of the law and with the evident intention of the law makers. The decision appears to us to be of general importance in regard to the practice of pharmacy, and we therefore give it in full. As to the propriety of reputable physicians prescribing a large quantity of a poisonous drug, it is evidently not limited or questioned by the law, though prudence may often dictate a safer course. Judge Elcock said:

"The deceased, Ann Carroll, being bantered to take some of the pills contained in the box, took fourteen of them at once, and several other persons took from eight to fifteen of them each. The pills were sold by the relator, who was in the employ of George I. McKelway, a druggist, by the order or prescription of Dr. Walter F. Atlee, and were labelled, as is usual, with the druggist's label and the directions—'Use one at meals, as directed by Dr. Atlee.'

"Involuntary manslaughter is when it plainly appears that neither death nor any great bodily harm was intended, but death is accidentally caused by some unlawful act not amounting to felony, or an act not strictly unlawful in itself, but done in an unlawful manner and without due caution. If, therefore, the duty rested upon the relator to label this box 'poison,' the failure to do so would be such negligence as would render him liable to the prosecution started. The question therefore is, Is it the duty of a druggist who sells a poison by direction of a physician to affix thereon the label aforesaid? A construction must be given to the act which must be in accordance with the intention of the framers of the law. By the report of the Commissioners of the Penal Code, it is stated that 'it was enacted to prevent mistakes in the sale of noxious drugs; to throw impediments in the way of malicious and wicked persons obtaining them for murderous purposes, and to facilitate the detection of such persons when their malignant purpose has been accomplished.' There is nothing, therefore, in the intention of the framers of the act to enact any law which would restrict or narrow the sale of the drugs for legitimate purposes or where directed to be used by the accustomed mode of legal practice known at the time. Two modes of sale are provided for, one by the prescription of a physician, and the other on the personal application of a respectable inhabitant of the place. The prescription furnishes all the information required by the law, and all that is given when the same is made on the personal application of the inhabitant. It is argued that the plain reading of the act would compel any one selling the drugs named to mark them as poison. If this were so it might also be argued that any compound containing poison should also be so marked, and thus any sale of a poison in the most infinitesimal quantity require the same labelling. A homœopathic

physician might be compelled to label his remedy in like manner. No good purpose would be served by such a construction.

"It is clear from a reading of the section, which is not artistically drawn, that it should be divided into sentences, and that the first sentence should end with the word 'physician,' where first named, and that the words 'such sales,' as they afterwards occur in the section, refer to sales made to others than those on the prescription of a physician. By this division of the section the reading of it will be in accordance with the end sought to be accomplished by the Legislature. The Legislature could never have intended that a prescription of a reputable physician in a case of delicate treatment in which one of the poisons named should be used in a proper quantity, should be sent by a druggist to the sick room of a nervous patient with the word 'poison' marked upon the label. Medical treatment would be ended, and the power placed in the hands of the druggists to destroy the benefit of the physician's remedy. Such a law would be destructive of medical science, unreasonable and against the spirit of sound legislation.

"The direction placed upon the box, 'use one at meals as directed by Dr. Atlee,' showed plainly the nature and power of the dose, and that it was not an article of food. If the unfortunate people who, in a rash banter, ate this box of pills, had been gifted with the smallest amount of prudence or ordinary caution in observing the directions upon the label, they would not have been the subjects of sickness and death as has resulted. I see not wherein the relator has been guilty of any breach of the law, and he should go hence freed and discharged of all liability. Relator discharged."

READY-MADE MEDICINES.—The article with the quaint heading, from the pen of Mr. J. Winchell Forbes, which we publish in another place, contains so much that points directly to the causes underlying the evils from which pharmacy suffers at present, that we believe it will be read with a great deal of interest, even though not *all* the views advanced by its author be accepted. We do not propose to comment upon the article itself, but merely refer to that sentence in which Mr Forbes characterizes the manufacture on a large scale of a certain class of medicines as a direct blow at the advancement of pharmacy. We would subscribe to this proposition, as we do to many other points advanced, if it had been stated upon the broader ground, that the pharmacist should himself prepare as many as possible of the various medicines which are used in physicians' prescriptions, as well as in the ordinary retail sales. Is he less responsible who dispenses the extracts, fluid extracts, elixirs, plasters, lozenges, suppositories and other classes of preparations from the manufacturers, than he who sells a sealed package of a drug or compound made by another? We fail to see any essential difference between the one and the other except possibly in degree; perhaps the one occupies the plane of the vendor of sugar and coffee, the other that of the vendor of canned fruits.

Division of labor has made so many inroads upon pharmacy that much of what was formerly his peculiar province, has been wrested from the pharmacist's laboratory; the manufacture of morphine, quinine and most other chemicals, which are largely used, will not again be undertaken by him. Does the case hold also good for the pharmaceuticals? We believe not. They belong to the pharmacist's peculiar sphere, and if he permits these to be supplied to him by others, he voluntarily places himself on a level with a common dealer, or approaches that position. The question

whether the pharmaceuticals purchased are equal in quality or not to those made by himself, has *à priori* nothing to do with the ultimate result. From personal acquaintance with a number of manufacturers and their products, we know that the material used and the products turned out by them, are as good as can be had from the better class of apothecaries. Moreover, we regard them, as merchants, to be perfectly justified in supplying an existing demand, or if possible creating a demand for their products; but in our opinion the true pharmacist is not, habitually, a purchaser of ready-made medicines.

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